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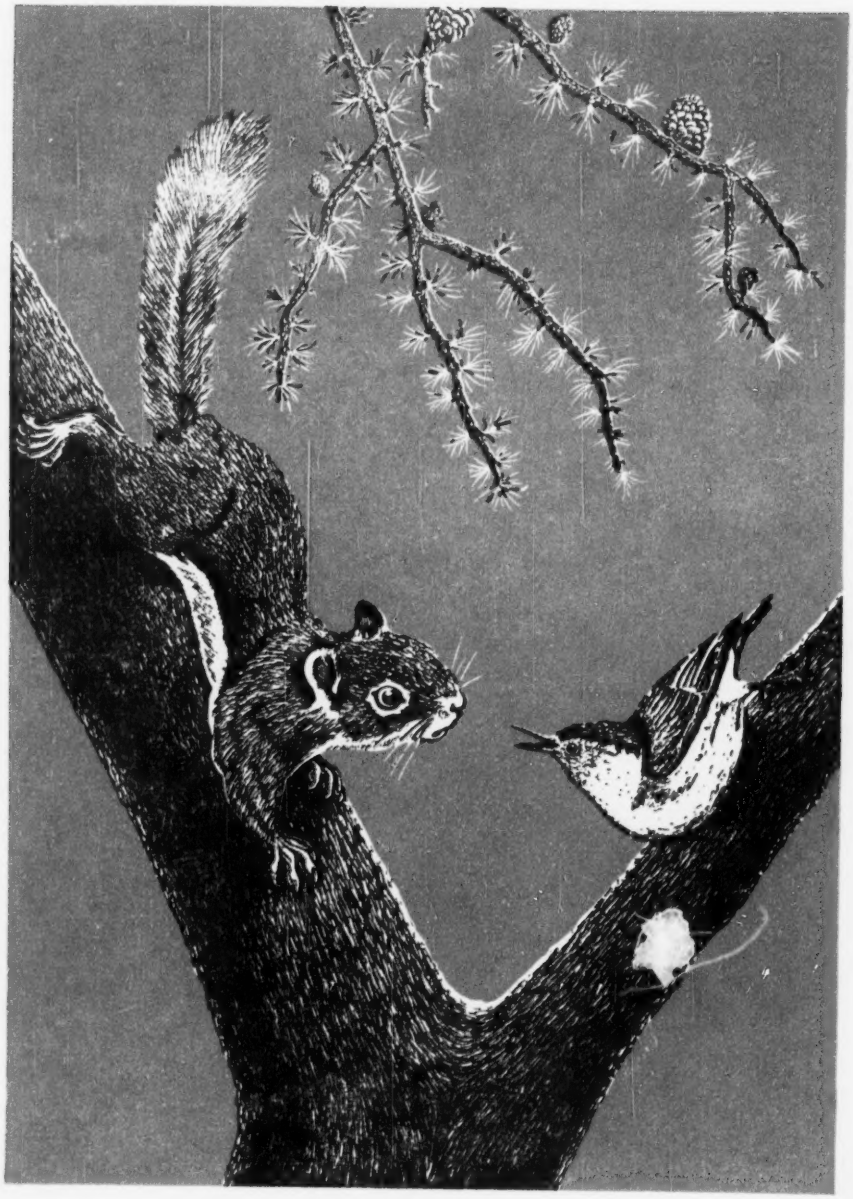

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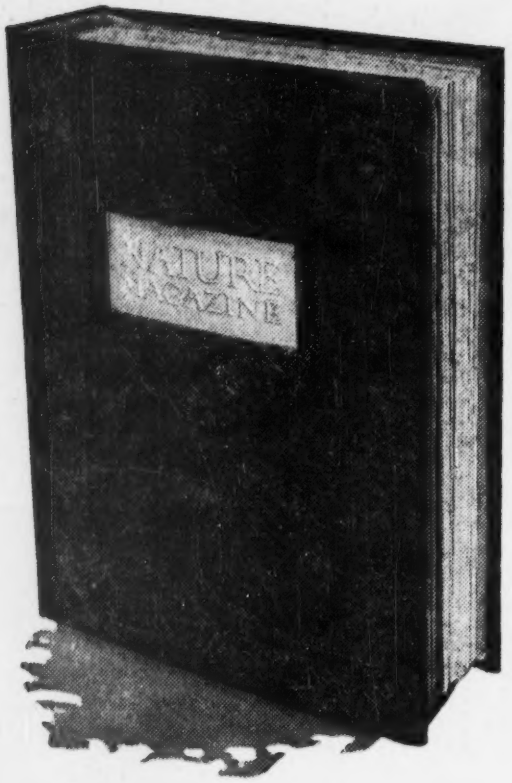

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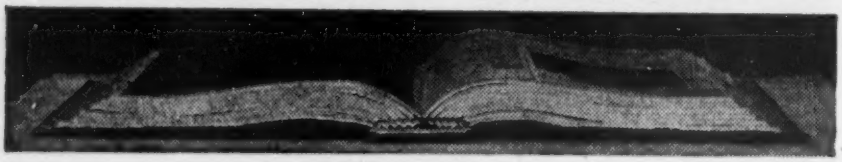

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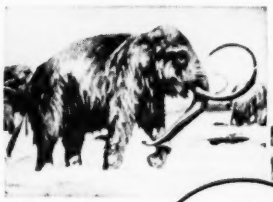

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Nature in Print

By HOWARD ZAHNISER

"THERE is indeed something royal about the month of August," Henry Thoreau wrote in his 1852 journal on the eighteenth of that month. I come upon this in an early-morning June browsing a century, and more, later as August on this page already is on my mind, and it seems nicely introductory. The heat of August, Thoreau mused, "is a more ingrained and perhaps more tropical heat than that of July." Then he added: "Though hot, it is not so suffocating and unveiled a blaze. The vapors in the air temper it somewhat." "But," he recalled, "we have had some pretty cool weather within a week or two, and the evenings generally are cooler."

Coolness is indeed a charm in August. As I read on, three or four pages, in this mid-Nineteenth Century August journal I find a refreshing paragraph. At 2 p.m. Thoreau walks out from Concord "To Corner Spring, Burnt Plain, and Brister Hill" and finds "it is already fall in some of these shady, springy swamps, as at the Corner Spring." Then comes the paragraph:

"Here is a little brook of very cold spring-water, rising a few rods distant, with a gray sandy and pebbly bottom, flowing through this dense swampy thicket, where, nevertheless, the sun falls in here and there between the leaves and shines on its bottom, meandering exceedingly, and sometimes running underground. The trilliums on its brink have fallen into it and bathe their red berries in the water, waving in the stream. The water has the coldness it acquired in the bowels of the earth. Here is a recess apparently never frequented. Thus this rill flowed here a thousand years ago, and with exactly these environments. It is a few rods of primitive wood, such as the bear and the deer beheld. It has a singular charm for me, carrying me back in imagination to those days. Yet a fisherman has once found out this retreat, and here is his box in the brook to keep his minnows in, now gone to decay. I love the rank smells of the swamp, its decaying leaves. The dark-green leaves of the fever-bush overhang the stream."

It is an inspiration itself to feel the inspiration of another. To sense that this August 19, 1852, refreshment has lived on a century in literature is like the delight of the rill itself flowing a millenium.

"Nature in print," indeed. But it was the "something royal" about August that enticed me, for I have been esteeming with Josephine Herbst some of the humble royalty of our democratic traditions—the Bartrams—and (I suppose) thought thus of this page as I browsed through Thoreau.

In a book of a kind all its own, a volume entitled *New Green World*, Miss Herbst has told the life of John Bartram in a biography that reaches its climax in its final pages about his son, William Bartram. The book begins with July 3, 1743, when John Bartram—forty-four years old, with already nine years experience "ransacking virgin forests for seeds and seedlings to go to England"—was setting out "from his home on the Schuylkill River, three miles from Philadelphia, to travel through the wilderness to Onondaga, Oswego, and Lake Ontario in Canada on a mission for the British government to the Indian tribes of the Five Nations." The book ends July 22, 1823, when the son William Bartram—eighty-five years old—happily began to write an article on the natural history of a plant and a few minutes later died suddenly as a blood vessel in his lungs ruptured. The near century that these two Bartrams spanned with their botanizing and explorations in the new, wild America was one that Miss Herbst makes live again with charm and adventure. But she sees more than the lives of these men, and it is this more that gives her book its title *New Green World*, and gives it also a character all its own.

We shall read again and again the lives of the Bartrams, and none has written with more sensitive understanding nor with greater interest than Miss Herbst. "Solid matter-of-fact John Bartram with his ingrained sense of awe and his rapture for the green world was followed by his more sensitive, often difficult son William. And William's account of the birds and Indians of Florida, wild glorious creatures all, was transformed in its turn into the poetry of Coleridge and Wordsworth, carrying imagery and idea far beyond the primitive forests through which the father and son had wandered." But beyond such nicely appreciative interpreting of the Bartrams and their achievements is Miss Herbst's perception of the goodness of the world that was realized in their lives and in their way of living, and is so constantly in jeopardy—if known at all—in ours. This gives *New Green World* its special meaning.

The Bartrams and the others in "the little coterie of men who devoted their lives to what was then known as natural history. . . were whole men confronting a whole world, not human beings floating in a culture medium," says Miss Herbst in her foreword. As she ponders the origin of her own book she realizes that the ingredient that she herself "wished to recover from that vast wilderness so passionately pursued was not only a botanical specimen but the confident lost 'I' of whole men." The men whose lives she "began to explore as Bartram had explored his wilderness seemed closer to stalks of grain in the field than we are." For them "the little twig, the light on a hill, became an experience not even possible to transmit into words." To us too often, Miss Herbst regrets, "the world comes second hand—fifth hand—and the illusion that it is fresh because it is shown as a picture of an actual place or is given as a 'true account' by some reporter who claims to have been 'there' divides man into incalculable parts without any true center." Perhaps in contemplating the character of the Bartrams, and the nature of the world as they perceived it, we ourselves can approach a center from which the universe seems whole.

In a "Last Word," which concludes her text, introducing the bibliography, Miss Herbst suggests that the poets should have the final word. "What the Bartrams saw and felt in the youthful days of an abundant world may be diminished but not lost," she observes, and suggests that "for city dwellers, who may not touch or intimately view, the written word brings this kingdom home." (Nature in print.) Miss Herbst finds this "richly, in the poems of Marianne Moore where the beasts of fable lie down with the mongoose and the tortoise; where fern seed and field mouse are at ease with ancient beetles and Durer's benign monsters." This sends me again to Marianne Moore's *Collected Poems* on my shelf, which I reread, and another evening share with poet-friends, reading aloud and exploring the kingdom thus brought home. And we all are thankful.

Yet the written word is poor indeed, despite its relative richness, if it alone bears the wealth of one's knowledge of "what the Bartrams saw and felt." Marianne Moore's poems realize their full creation when the animals that lie down in them and are at ease are already known in part, in actuality to the readers, or the auditors, of the poems. The world of the Bartrams, the wholeness that Miss Herbst perceives, lives in creative imagination best for those whose thought perceived from the written word is inspired also by the intimations of personal experience.

So it is that one covets for all a first-hand experience in woods and fields and along streams and on the water—for a touchstone in reading and contemplation, as well as for its own joy. So it is

Surprise Symphony

By JOHN F. DAVIDSON

From somewhere high in that tall tree
Comes song-sparrow's wild clear symphony
Once heard by Haydn, and named with wise
And lasting artfulness—Surprise.

Perhaps he graced once long ago
A rocky isle like this—and lo,
Listening first with all his soul
To this same song, transformed it whole
To melody of matchless worth—
A bird in music brought to birth.

But even the master's song less thrills
Than the careless tune this lone bird spills.

that wilderness is preserved in parks and forests where one can continue to experience the world of which he is truly a part—as a basis in actuality for an understanding of the written word that brings home the kingdom of the Bartrams.

As I finally run once more through the pages of *New Green World*, browsing on its leaves, I catch the name "Thoreau" and read Miss Herbst's wise comment that "when Thoreau began to speak out plainly in the Nineteenth Century, he put into precise language many of the feelings and thoughts, some of the attitudes toward man and Nature, that had ruled Bartram's life." And I feel a satisfaction at having come a full circle from that early morning Thoreau browsing that brought to mind Josephine Herbst.

But the evening is warmer than the morning, its humidity closer, and the summer i-cumen in forecasts August in a fashion that recalls Thoreau's "pretty cool weather" much less pointedly than it does my sensible wife's wonder whether Thoreau had any idea of what August could be like here in Washington, D. C. In any case I take comfort in the fact that August anywhere runs into September, and I can always find coolness in print. What a cool title: *New Green World!*

New Green World. By Josephine Herbst. New York: Hastings House. 1954. 272 pp. (5½ by 8¼ in.), with 10 photographs on 8 plates, endpaper reproduction of a map of John Bartram's journey into the wilderness (1748) drawn by Lewis Evans of this mission to the Five Nations, and bibliography. (Alas, no index!) $4.

Shells

American Seashells. By R. Tucker Abbott. New York. 1954. D. Van Nostrand Co. 541 pages of text and 80 pages of illustration, including 24 new color plates. $12.50.

This fine book is a guide to the shells of the Atlantic, Pacific and Gulf shores of the United States and Canada, Central America, and the Islands of the Caribbean. Its author is Associate Curator of the Division of Mollusks of the Smithsonian Institution, and, for the first time, he has brought within the covers of a single volume identification of the shells of both the Atlantic and Pacific shores. The first 88 pages of the book are devoted to a readable discussion of the natural history of seashells, the relationship of man to mollusks, the life of snails, of clams and of other mollusks, the collection of American seashells and how to know them. The remainder of the book is devoted to identification. Here is, of course, a volume that is almost essential to anyone who makes shells a hobby or a profession, and it is a reference work that is equally essential for libraries. It is not, being in large size, a field guide, but that certainly is not vital with respect to shells, which are brought home for study and classification. The author has achieved a standardization of popular names, a real achievement in itself.

Briefly Noted

Haunt Fox. By Jim Kjelgaard. New York. 1954. Holiday House. 220 pages. $2.50. The story of a red fox, of a boy and a dog, and the wilderness where the fox lived and the boy and dog hunted him.

Monarch Butterfly. By Marion W. Marcher. New York. 1954. Holiday House. Illustrated by Barbara Latham. $2.00. The life story of a familiar butterfly. A book in this publisher's "Life-Cycle" series for the younger reader.

On Going to Live in New Hampshire. By Paul Scott Mowrer. Sanbornville, N. H. 1954. Wake-Brook House. 109 pages. $2.50. A book of charming poems, the fourth book by this author. The book itself has been produced by handicraft methods.

The First Book of Cotton. By Matilda Rogers. New York. 1954. Franklin Watts, Inc. 69 pages. Illustrated by Mimi Korach. $1.75. The story of cotton, its production, manufacture and importance to man and the world.

Meditations on A High Hill. By Joy Carver. Perkinston, Miss. 1954. Southland Press. 72 pages. $1.00. Collection of poems by an able poet with a deep love for and understanding of Nature.

Concerning the Nature of Things. By Sir William Bragg. New York. 1954. Dover Publications. 232 pages. Illustrated. $2.75 cloth; $1.25 paper. Popular discussion of atoms, gasses, liquids, and crystals in gems, ice and snow and metals.

Tike and Tiny in the Tetons. By Frances Joyce Farnsworth. Albuquerque, N. M. 1954. University of New Mexico Press. 162 pages. $2.00. A story for a young audience about twin cubs of Grand Teton National Park.

The Nature of Light and Color in the Open Air. By M. Minnaert. New York. 1954. Dover Publications. 362 pages. Illustrated. $3.95 cloth; $1.95 paper. The how and why of shadows, reflections, rainbows, mirages and more than one hundred other phenomena of light and color. A popular presentation of an interesting subject.

Water from the Ocean

Fresh Water from the Ocean for Cities, Industry and Irrigation. By Cecil B. Ellis. New York. 1954. The Ronald Press Company. 217 pages. $5.00.

This is a Conservation Foundation study by the author in association with members of the staff of Nuclear Development Associates at White Plains, New York. As the title indicates, it explores in readable fashion the possibilities of drawing upon the waters of the ocean, converting them to fresh water and using them to relieve shortages of water that beset communities, industry and the producer of food crops in many places.

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Flower Photography

Photographing Your Flowers. By John P. and Mary A. Roche. New York. 1954. Greenberg. Illustrated. $3.75.

Flower photography, indoors and out, calls for certain special techniques and this camera field is, therefore, a specialized one. The authors of this practical and most useful book are a husband and wife team operating a business devoted exclusively to horticultural illustration. They write against a background of intimate knowledge, covering outdoor photography in black and white and color, close-ups, indoor photography, flower arrangement photographs and other related details of this specialty. This book is of particular interest to the gardener who wishes to keep a permanent record of his gardening successes.

Animal Control

Animal Control in Field, Farm and Forest. By W. Robert Eadie. New York. 1954. The Macmillan Company. 257 pages. $3.75.

Certain kinds of animal life have an adverse effect on man's economic interests with respect to crops and property. So man takes steps to control or eliminate those creatures he calls "varmints," or by some more emphatic term. Often man does not exercise this control wisely and destroys valuable forms in the process, thus upsetting the balance of things even more than he has already done by taking over animal habitat. In this book the author presents a practical discussion of control, but with much emphasis on natural controls and on the value of enlisting the cooperation of Nature's own controllers.

Kieran's Trees

An Introduction to Trees. By John Kieran. New York. 1954. Hanover House. 77 pages. 100 trees in full color by Michael H. Bevans. $2.95.

This is a companion work to two earlier books by John Kieran introducing the user to the birds and to wild flowers. All are books for beginners, with the information presented simply. In this immediate instance the introduction is to the more common trees. Mr. Kieran's text is informal and the illustrations show leaves, buds, bark and fruits of the trees discussed. The book is in large size so it is most useful at home rather than in the field.

Animal Tracks

Animal Tracks. Harrisburg, Pa. 1954. The Stackpole Company. 64 pages. Illustrated. $1.50.

This is a standard guide for identification by tracks of many of our small and large mammals. The track drawings are by Luis M. Henderson, Canadian artist, and R. Marlin Perkins supplies a brief foreword. The author of the text is unidentified.

Animal Favorites

101 Favorite Animals and Birds. By Diana Thorne. New York. 1954. Sterling Publishing Co. 140 pages. Illustrated by the author.

The author-artist is noted for her dog illustrations and for her ability to infuse personality into the representations of our canine friends in pen, pencil or brush technique. Her interest, however, is not confined to the dog and in this book she presents pictures of dogs, horses, zoo animals, cats, birds, and others to the total of 101. With each drawing is brief, popular text.

Basic Botany

Basic Botany. By Fred W. Emerson. New York. 1954. The Blakiston Co. 425 pages. Illustrated. $5.00.

This introduction to the science of botany was first published in 1947 and this is a second and revised edition of this textbook. Research has added new knowledge in the relatively few years since the first edition appeared, and this is recognized in the revision. The general outline that proved successful originally has been followed here, but emphasis has here and there been changed in the light of new data. A much more inclusive list of references is provided.

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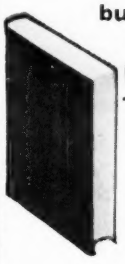

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THE GUIDE TO SUMMER CAMPS

9th edition, 112 pp., paper, $1.10 cloth, $2.20

The Guide offers listings including features, enrollment, tuition, summer and winter addresses of directors for boys, girls, coeducational and travel and exploration groups, summer study and special opportunities, etc. A helpful guide to find the wider horizon for the boy or girl. Most useful!

PORTER SARGENT
11 Beacon St. Boston 8, Mass.

Resources for Future

Announcement is made by R. G. Gustavson, president and executive director of Resources for the Future, Inc., that The Ford Foundation will support that organization's program of research and education for a five-year period at an average annual level of about $750,000. The grant has been formally accepted by the board of directors of Resources for the Future, of which Horace M. Albright is chairman.

"I am glad," Dr. Gustavson said, "that The Ford Foundation has expressed its confidence in Resources for the Future, and on a scale that will enable us to make a real start on work that very much needs doing. Some of the problems related to developing and conserving our natural resources already are critical and more may become so as our population grows and our economy continues to thrive. Demands upon our soil and water resources are rising every year, as also are demands on the nonrenewable mineral resources—fuels, metals, and the rest—of our own country and of other lands.

"The way in which these issues are met will be of deep concern to everyone in the country. Many of the answers may call for policy-making and action, public or private; these are beyond the scope of Resources for the Future. But in almost every instance finding the best answers will call for more facts and better understanding. There is still much to be learned about our natural resources and how to use them, and about how the many different resource situations are related. Also the knowledge that has already been gained is not always carried fast enough to all the people who need it. Resources for the Future, interested in the whole range of natural resources, will concentrate on research and education. Our aim is to encourage and supplement, not to duplicate, the work already undertaken by well qualified groups and individuals."

Conservation Education

More than 150 members, conservation-minded educators and scientists are expected to attend the annual work conference of the Conservation Education Association to be held on the campus of the University of Wyoming at Laramie, from August 21 to 25. The conference topic this year will be "Teacher Education in Conservation." Three teacher education institutions have been selected for an intensive study of their curricula. The C.E.A. was organized in 1953 as an outgrowth of the National Committee on Policies in Conservation Education. It supports the philosophy that we shall get good conservation only through education. Dr. A. G. Peterson, President of Eastern Montana College of Education, is President of C.E.A. Those interested in attending the Laramie sessions should contact Dr. John W. Scott, 1409 Garfield Street, Laramie, Wyoming.

Conservation Degree

Announcement is made by Purdue University that, effective September 1, 1954, it will offer a course of study leading to the degree of Master of Science in Conservation. This new degree will be available primarily to graduate students under the direction of any of the three sponsoring departments of agronomy, biology and forestry.

Bird Song Record

"Bird Songs of Dooryard, Field and Forest," Volume No. 2, recorded by Jerry E. and Norma Stillwell, is a most welcome sequel to their Volume 1, both long-play recordings. Volume No. 2, recently issued, not only maintains the high standard of recording and reproduction so evident in Volume 1, but may even surpass it. Here we have brought to us 140 different calls and songs representing 58 species, superbly reproduced. Several songs are reproduced at reduced speed so that the listener can more fully appreciate the beauty and quality of the song. The birds whose songs are similar are placed in groups so that their songs follow one after the other thus making it easy for the student to compare carefully and note differences, and thereby fix in his mind the distinctive characteristics of each song.

The Stillwells are to be complimented for their wide selection of bird songs, and especially for including a goodly number of wood warblers whose songs are very high-pitched and consist of short, weak, buzzy and squeaky phrases. These are reproduced rather weakly but in keeping with what one would hear in the field. The recording is remarkably free of extraneous background sounds.

The interesting comments by the Stillwells, appearing on the jacket, give us information on the ecology of several species as well as sharing with us some of their experiences in recording. Bird and nature students, teachers and parents will welcome this Volume 2 with enthusiasm. It is one to add to our present library of bird songs, or the one to begin such library. D. Ralph Hostetter

Ecology

Principles of General Ecology. By Angus M. Woodbury. New York. 1954. The Blakiston Company. 503 pages. Illustrated. $6.00.

The author, who is Director of Ecological Research at the University of Utah, presents this book as a college text in general ecology for the upper-division level. Its interest and value, however, is not confined to the college student but is of use to field workers in applied ecology and the layman interested in this science of the interrelationships of living things. The book is organized, after introductory material has been presented, into two logical sub-divisions, one dealing with the physical environment and the other with the biotic environment.

Growing Wild Flowers

Wild Flowers and How to Grow Them. By Edwin F. Steffek. New York. 1954. Crown Publishers. 192 pages. Illustrated in color and black and white. $3.95.

Here is a book that fills a gap in horticultural literature, being the first and really the only practical book on the cultivation of wild flowers. Sponsored by the American Nature Association and the Wild Flower Preservation Society, these organizations join with the author in urging people to learn how to be hospitable to our wild flowers to the end that these native wild plants may withstand the steady march of civilization. To achieve this conservation it is necessary to know the often special requirements of the plants as to soil, seasons, water, light, drainage, climate, enemies and otherwise. Ability to identify the plants is, of course, essential, and then knowledge of how to transplant them to the home garden or to other safe surroundings. The author treats with more than 350 species. Tables showing soil preferences, lists of flowers that may be picked freely, and those that should be picked in moderation, are provided. A group of color plates is excellent, but we could wish that the publisher had been equally successful with the black and whites, which are reproduced in small size, and not too successfully, by the offset process employed. However, the text is the most important part of the practical value of the book.

Pet Fair

The first International Pet Fair will be held in Chicago at the International Amphitheater from September 21 to 26. Pets from the fair corners of the world will be presented at the fair, which is open to the public as well to those in the pet trade.

Beaver Valley

Announcement is made by the Non-Theatrical Film Division of Walt Disney Productions, 2400 West Alameda Ave., Burbank, California, that the fine True-Life Adventure film, "Beaver Valley," is now available in 16mm sound for non-theatrical film users. This film has won many honors and is being released because it was named in more requests from schools and churches than any others in this series.

Conducting Trips

"Conducted Trips" is the title of a most useful booklet for in-service training prepared by the Chief Naturalist, National Park Service, Department of the Interior, Washington 25, D. C. It is designed to assist those who conduct visitors afield in making their leadership fully effective. The booklet is available only in limited quantity, and its distribution is limited to those working in park management, outdoor and conservation education, and in naturalist programs.

Contents Noted

CANADA'S waterfowl breeding areas constitute the greatest source for the annual increase in the numbers of our continental duck and goose population. As go conditions in this region, so goes the migratory waterfowl resource. Director John L. Farley of the U.S. Fish and Wildlife Service reports that early survey of conditions to the north are not reassuring. Drought last fall and winter dried up many pot holes and sloughs, and lowered the water level in other water areas. Snow and cold well into May this year held back the northward migration and kept birds in the drought-affected prairie region. The result has been that, although adequate numbers moved north, complete migration and nesting have been delayed, and spring plowing and burning at the time of first nesting attempts have been detrimental to the success of raising migratory waterfowl families. This situation is graphic evidence of the way Nature and man can influence our migratory waterfowl resources. In its May release the Fish and Wildlife Service says: "Lack of rainfall in key areas will seriously curtail production. Since both 1952 and 1953 were banner waterfowl producing years, a drop off from that production may indicate a need for a proportionate reduction in the harvest."

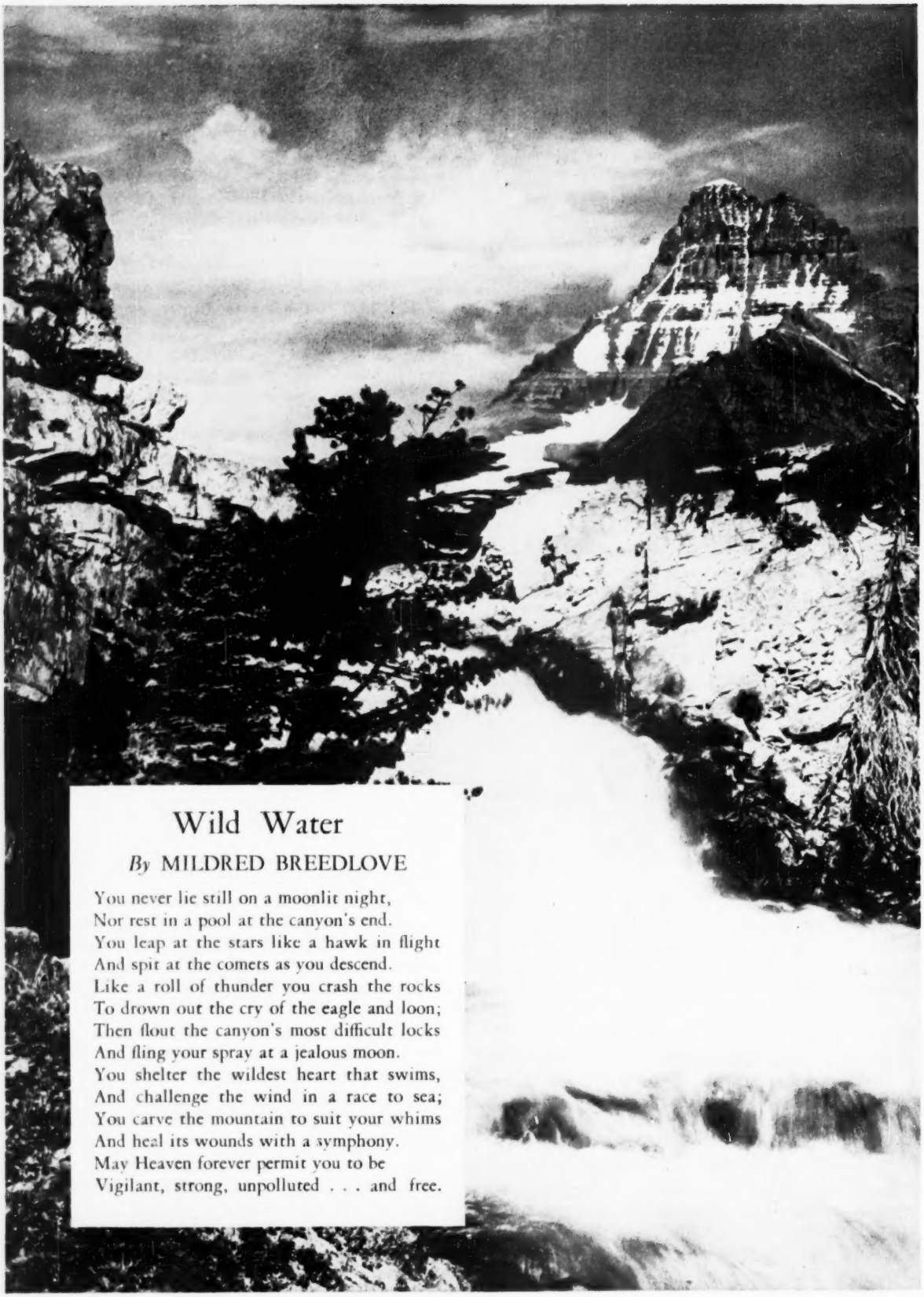
WHILE on the subject of migratory waterfowl, we are interested to note the most recent statement of the Fish and Wildlife Service on its expenditure of duck stamp dollars from 1935 through 1953. This statement, as revised up to May 3, 1954, gives an revealing picture of the importance that these dollars have had in maintaining our ducks and geese. In the light of our editorial comments in April and May, we were particularly interested in one sentence in this statement. Referring to the amendment of the Migratory Bird Hunting Stamp Act of 1934, the significant sentence reads: "This Act, approved on August 12, 1949, authorizes the Service to open up to 25 percent of new areas to public shooting." The word *new* indicates recognition by the Service of the intent of Congress, and the understanding of those supporting the amendment, that areas previously purchased for refuges with duck stamp dollars would continue to enjoy the inviolate status prescribed in the original act of 1934.

IN OPPOSING the invasion of Dinosaur National Monument through the erection of Echo Park Dam, defenders of the integrity of our national parks and monuments urged that specific alternative sites exist outside the Monument and should be used. Interior Department spokesmen, including Ralph A. Tudor, Under Secretary, opposed the alternative dam at Glen Canyon because of alleged greater loss of water by evaporation. Back in 1950 the Bureau of Reclamation claimed that the outside-the-monument site would loose 350,000 acre-feet of water a year compared to the proposed Echo Park and Split Mountain impoundments within the area. By 1953 this figure was given as between 100,000 and 200,000 acre-feet. When the hearings on the bill that included Echo Park dam were held, Secretary Tudor gave a figure of 165,000 acre-feet lost. This was directly questioned at the hearings, and by March the differential had shrunk to 70,000 acre-feet. Finally, in a letter dated five days before the House committee voted 13 to 12 for a favorable report on H.R.4449, the estimated water evaporation comparison was scaled down to 25,000 acre-feet. Thus what Secretary Tudor earlier described as a "fundamental issue" in weighing the merits of these two proposed dam sites seems also to have evaporated.

THIRTEEN years ago the Seventh North American Wildlife Conference was held in Toronto. Now, thirteen years later, the twentieth North American Wildlife Conference will return to Canada, meeting in Montreal from March 14 to 16, 1955. This has always been an international gathering of conservationists and technicians, and has enjoyed the active participation of men and women from Canada and Mexico. It is, indeed, probably the most important conservation gathering held each year, and it is sponsored by the Wildlife Management Institute. As usual, all phases of the restoration and wise management of renewable natural resources will be discussed.

ACCORDING to a dispatch to the *Chicago Daily News* from Australia, that favorite of Australian coins, stamps and coat-of-arms, and many crossword puzzles, the flightless bird—the emu—has become a problem "down under." Persecuted for a long time, the bird, five years ago, seemed headed for extinction. So a breeding program was started and has been so successful that emus now roam the countryside in numbers and find Australian wheatfields an easy source of food, to the end that fencing is planned to keep the birds out. When campaigns were being instituted against the emus soldiers were sent out in armored cars with machine guns, but the birds easily outdistanced the cars and outmaneuvered them, too. Another time an attempt was made to ambush the birds at a water hole, where many of them congregated. Machine guns were used, but the emu's hide is tough and thick layers of feathers were difficult to penetrate, so that fewer than a dozen birds fell to the barrage. Finally the Australian military was forced to admit defeat by the birds, and fortunately the crossword puzzle reference to the emu does not refer to it as extinct. We wish this tough and crafty bird well.

R.W.W.



Wild Water

By MILDRED BREEDLOVE

You never lie still on a moonlit night,
Nor rest in a pool at the canyon's end.
You leap at the stars like a hawk in flight
And spit at the comets as you descend.
Like a roll of thunder you crash the rocks
To drown out the cry of the eagle and loon;
Then flout the canyon's most difficult locks
And fling your spray at a jealous moon.
You shelter the wildest heart that swims,
And challenge the wind in a race to sea;
You carve the mountain to suit your whims
And heal its wounds with a symphony.
May Heaven forever permit you to be
Vigilant, strong, unpolluted . . . and free.

King-Size Grass

Bamboo offers hope for a new money-crop for growing in the South.

By
E. JOHN LONG

U.S.D.A. PHOTOGRAPH

A "forest" of bamboo growing in Georgia.

PERHAPS you have thought of bamboo as something that grows luxuriantly in steaming tropical jungles, with a tiger or an elephant sticking a menacing head out from its deep, mysterious shadows. Because it is tall, has a woody trunk, and long, willow-like leaves, you may have considered it a tree.

You would be wrong on both counts. Of course, bamboo thrives in jungles, but it can also be made to grow outdoors in the United States as far north as Washington, D. C., and in almost a quarter of the rest of the country. Two species of bamboo, in fact, are native to southern United States. And, although it looks like a tree, botanically bamboo is a grass, a king-size cousin of corn, wheat, oats and sugar cane.

In the long search for something to emancipate certain areas of the South from dependence upon a single crop, such as cotton or tobacco, agricultural scientists have done a lot of testing and experimenting. They now are convinced that bamboo is another possible money-making crop, in addition to a provider of many things needed on the American farm.

This is the conclusion of the Engineering Experiment Station of the Georgia Institute of Technology, which has just finished what is probably the most thorough evaluation of bamboo as a crop that has ever been undertaken. The project was done under contract for the Plant Introduction Section of the U. S. Department of Agriculture.

This new Georgia Tech survey not only discovered a wider growing area for bamboo in the United States than had previously been suspected, but it also foresees many additional uses and applications for this skyscraper among grasses, which not only looks like wood, but in many instances can be substituted for it.

The United States, despite its abundance of many kinds of timber, metals and plastics, uses a surprising amount of bamboo—poles, split, shoots—every year in the manufacture or fashioning of some seventy different products. Most of it is imported. In 1951, the latest year for which figures are available, the value of these imports was more than $1,700,000.

Yet thirty-seven species of seedling bamboo have been tested and are now available in American nurseries. One or more varieties of bamboo can be successfully grown in all but the mountainous regions of nine southern States—Alabama, Florida, Georgia, Louisiana, Mississippi, South Carolina, Texas, and eastern North Carolina and Virginia. As a decorative plant bamboo may be raised in southern California, Arizona and New Mexico. Arboretums as far north as Pennsylvania and Massachusetts have kept experimentally a few bamboo plants alive in sheltered, outdoor locations.

Furthermore, bamboo does not require any large amount of land, or a special soil. A plot of well-drained sandy loam is best, possibly an area not useful for any other purpose, or a corner of the lawn or the barnyard will do. Bamboo planted along a fence or hedgerow, if properly cut and thinned, soon produces an effective windbreak or snow barrier. Once established in an open area, bamboo forms a grove that grows steadily larger in all directions, because the plant spreads from the roots.

For the gardener or farmer who likes quick results, bamboo delights and astonishes. Except along the northern limits of its range, this grass should deliver a usable product in a little more than a year, and a paying crop within six years, in contrast to pine and other fast-growing trees, which require 40 to 50 years before they can produce substantial revenue.

In the tropics bamboo's development is even more phenomenal. The plant surely must have been the inspiration for the story of Jack and the Beanstalk. There, some species shoot up three feet in twenty-four hours! Like the tall corn of Iowa, you can almost hear it grow, and it does most of its growing at night. Jack, however, would be well advised not to climb, or even shake, a new bamboo stalk too soon. In its early, green days it is quite brittle.

Record height in the Orient is a little more then one-hundred feet, with a trunk or culm eight to ten inches in diameter. Full height of any bamboo anywhere is generally attained in an all-out effort of six to eight weeks, usually in the spring, or the rainy season. After that, the plant strengthens its cellular structure. It does not reach real maturity until the third year. In semi-tropic lands, such as Florida, bamboo seldom exceeds sixty feet in height, or a diameter of six inches.

In answer to the question "How many kinds of bamboo are known?" scientists reply: "From 500 to 1000 species." The reason why they allow so much leeway is because bamboo seldom comes into flower, and characteristics of a plant in flower are quite different from those between flowering periods. So a great deal of basic scientific research in genera remains to be done. It will be a slow process, with some species flowering only once every fifty or sixty years!

For practical purposes, however, bamboo may be divided into just two classes—*caespitose*, or clump-forming, and *dumetose*, or running.

Clump-forming types are generally tropical plants, only a few being hardy enough to endure freezing temperatures. Running (sometimes called "creeping") bamboos usually are found in temperate regions. They differ from the clump-formers in that the underground stems (called rhizomes) grow out from the parent stem underground for some distance, before turning up to form a new stalk or culm. In the case of the clump-forming bamboos, the rhizomes immediately turn up from the parent plant to form new shoots.

Bamboo is different from other woody plants in that the full diameter of the stalk or culm is attained when it is only a few inches high, and also because it does all of its growing in one season. The original shoot, which looks like an artillery shell emerging from the ground, is encased in a gray-green sheath that is shed about a month after it appears. Leaves do not sprout until the stem is some distance from the ground.

IOTOGRAPH BY THE AUTHOR

This stand of bamboo grows in Virginia's Blue Ridge at an elevation of 900 feet. It grew to a height of ten feet in ten years.

If you live on a farm in an area where bamboo can be grown you will find many uses for the plant on the farm itself, in addition to shade and provision of a wind-and-snow break.

"Already the growers of pecans, almonds, walnuts and prunes have learned that there are no poles so light and efficient as bamboo poles for harvesting their crops of nuts and fruits, while orchardists are beginning to wake up to the convenience of having light bamboo ladders, and bamboo poles as props for their fruit trees," Dr. David Fairchild, the famous plant explorer, points out in one of his reports on bamboo for the Department of Agriculture.

In addition, bamboo has found farm favor as plant stakes, bean poles, shade houses, poultry coops, fruit and vegetable crates, and as piping for temporary irrigation lines. Because so many farms now possess their own fish pond, there is an increasing demand for fishing poles. As TV extends its range and listeners, bamboo provides a self-insulating antenna support.

But one could hardly expect the average farmer to take the time and land to raise bamboo for such limited uses alone. Consequently the main part of the Georgia Tech report deals with large-scale production of bamboo for commercial purposes, such as the making of paper. Various species of bamboo have been and still are being made into paper in China, Argentina, Germany, India, Indo-China, Venezuela, and Siam.

Experiments conducted by the Herty Foundation Laboratory, at Savannah, Georgia, indicate that both high-grade paper and newsprint can be made from American-grown bamboo. (As a means of demonstrating this, the press release describing the paper-making experiments was printed on bleached 100 percent bamboo paper).

Whether bamboo can compete economically with pine and other species, however, depends upon a possible future shortage, which seem to be imminent, and much larger production of bamboo within the United States. The latter does not necessarily mean large plantations of bamboo, but many more small producers.

Second only to making paper, the most important potential use of bamboo would be in light-but-strong construction. Ladders, scaffolding, temporary trestlework, footbridges, and other building jobs would find bamboo more portable and more easily handled than wood or metals now used for these purposes.

In the Orient bamboo employed in construction is

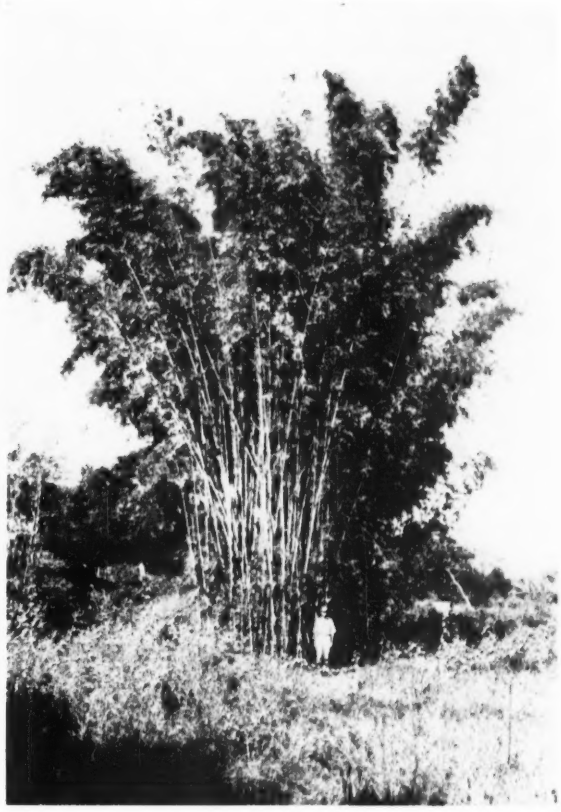
U.S.D.A. PHOTOGRAPHS

Rhizomes or underground stems of the clump-forming bamboo of the tropics. These stems turn up from the parent plant to form new shoots and are full diameter when they first emerge from the ground. Right, a thicket of clump-forming bamboo that grew from a single stem at the experimental station in Puerto Rico.

lashed together, or is drilled through and fastened with wooden or bamboo pegs. We have found a better way. The ends of each section are reamed out on a slight taper; then a thin sheet of a plastic adhesive and an aluminum plug, threaded internally and shaped to fit closely into the reamed seat, are placed over the tapered opening, and the plug and plastic forced in under pressure. Induction-heating seals the plastic to the metal and the bamboo, forming an almost inseparable bond. In another arrangement, threaded collars are made to fit over the shaped ends

U.S.D.A. PHOTOGRAPH

How running or creeping bamboo grows. New shoots come up from the root at intervals of five or six inches. This type of bamboo grows in temperate climates.



of the bamboo sections and the sections are joined by lightweight union connectors.

Another promising application of bamboo is in ordinary concrete reinforcement, instead of metal rods. However, experiments show that not all species of bamboo are suitable for this purpose, and care must be taken that no green stalks are used. Nor will bamboo reinforcing carry the load or strain of metal, and therefore should be used only to prevent cracking or breaking of the concrete itself in walls, curbing, and the like.

A market already exists in this country for bamboo furniture and household ornaments, for which manufacturers at present use imported material. Since practically all the species of bamboo grown in the Orient for this purpose can be raised without difficulty in the United States, much of this market might be supplied by American-grown bamboo.

Split bamboo, used in making blinds, screens, picture frames and ornamental items, once came almost entirely from China. With an embargo on Chinese trade, this market also is now wide open to American producers. Mexico and Trinidad have already begun to move into the vacancy. Edible bamboo shoots, in regular demand by Chinese and Japanese restauranteurs in America, also might be locally produced as a by-product in thinning bamboo groves to keep them from spreading beyond the areas desired for them. One American canner of Chinese and Japanese foods

declares he will take the entire output of any American producer of bamboo shoots.

Bamboo leaves of many species, both fresh and silaged, make excellent fodder for farm stock. Left to rot on the ground, bamboo leaves provide the best possible fertilizer for new shoots. Bamboo itself is an evergreen, but it regularly replaces its leaves.

Miscellaneous uses for bamboo include fiber for roofing, corrugated media for containers, phonograph needles, tooth brushes, rug poles, fuel, baskets and other woven wear, including mats, broom handles, garden rakes, flagpoles, and such.

If this list seems long, consider the place of bamboo in the Orient, where metals and other materials may be expensive, or not available at all. There, most human needs are, to some extent, met by this versatile plant—food, shelter, weapons, clothing, bridges, water pipes, bags, baskets, flooring and furniture, to mention only a few.

Once, a missionary in the Orient, who had made a life study of bamboo, attempted to list all of its uses. He ran the total up to 400, and then admitted his list was far from complete. Another declared that if bamboo had not existed in some parts of the Far East, the good Lord would have had to have invented a substitute, so vital is it in everyday life.

The current manner of describing Red China as "behind the bamboo curtain," puts the plant into politics, and acknowledges the dominant role played by it in the Orient.

When did bamboo first come to America? Ignoring the two native species, which are swamp dwellers and of little value, the first successful plantings of Oriental bamboo took place near Savannah, in the early eighties, when Andreas E. Maynelo, a Cuban, set out some shoots from Japan on his estate "Valumbroso." This was an ornamental planting. When Dr. Fairchild learned, in 1919, that it was about to be cut down he induced a friend, Barbour Lathrop, of Chicago, to buy the plot. It was later accepted by the United States Government, and is known today as the Barbour Lathrop Plant Introduction Garden.

As a result of the pioneer experimental work done there, and at subsequent plantings in Bakersfield, California; Avery Island, Louisiana; Anderson, S. C., Coconut Grove, Florida, and elsewhere, bamboo well adjusted to the American climate has been made available to a number of nurseries and thus to the general public.

From the Office of Plant Introduction in Beltsville, Md., has come a steady stream of newly imported, selected bamboos, gathered by agricultural explorers and correspondents. Today new species (semi-tropical) are first sent to the Department of Agriculture's plant quarantine station at Glendale, Md., and there they remain for two years before being forwarded to experimental centers. Research work in tropical bamboos is conducted at the Department of Agriculture station at Mayaguez, Puerto Rico.

While the Japanese for centuries have been probably the most ingenious people in devising ways and means of utilizing bamboo, the only man they have honored for doing so is an American! In the beautiful bamboo grove at the Iwashimizu Shrine, near Tokyo, stands a stone memorial, dedicated in 1934 to Thomas A. Edison. Mr. Edison, it reminds us, carried on a long search for a satisfactory filament for the first incandescent lamp. Finally, in 1880, he tried a strip of charred bamboo from Iwashimizu grove. It glowed without being consumed when an electric current passed through it, and the electric light was born.

Bamboo has long since been replaced by tungsten, and other materials, as a lamp filament, but who knows when someone may find still another use, to add to the long list of services performed by this most versatile of all the world's plants; this valuable king-size grass.

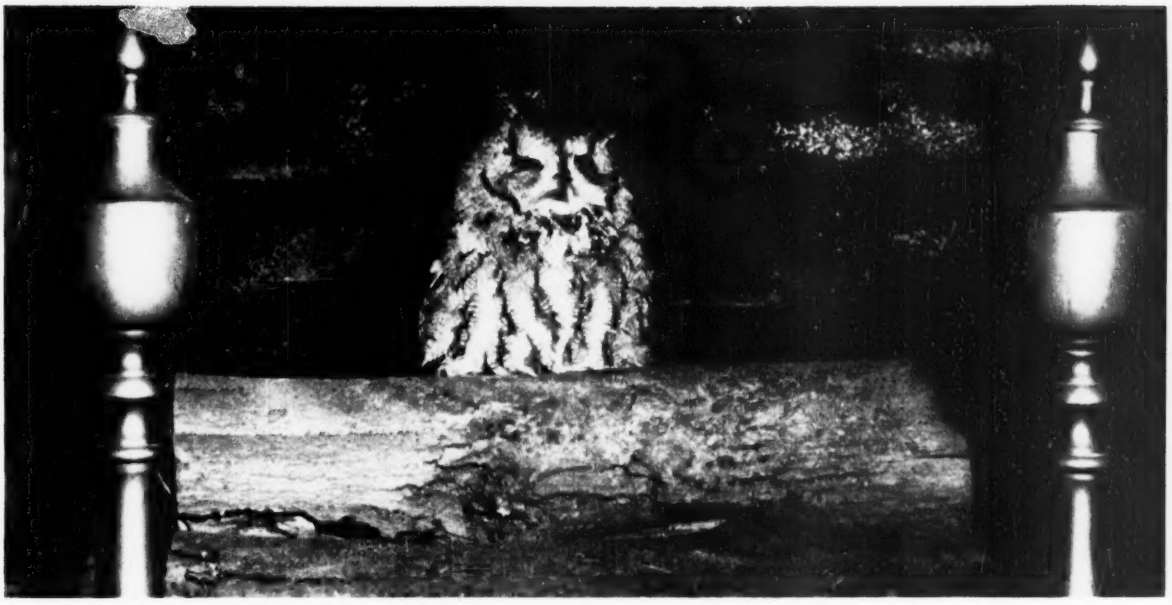
★

Summer Storm

By CHRISTIE JEFFRIES

Shadow crept in the hollows,
Where it lay like a sooty drift;
Then shadow fell on the meadows.
The storm cloud swept in, swift
And ominous as a blacksnake—
Thick and sinuous and long—
Writhing in where the hills break,
Backed by a wind so strong
The mightiest trees bowed to the ground
Beneath its whirling lash;
A river foamed and churned as it wound
Deep in the hollow's gash.

With darting tongue of fire,
The snake cloud leaped at its prey.
Light girdled hilltop, spire;
Thunder, like hounds at bay,
Growled and rain descended—
It pelted shrubs and land
In savage fury—ended
As if by sharp command.
Then dark clouds broke, paraded;
Quick sunrays arrowed through,
And rainbows twinkled, faded
Into immaculate blue.



The owl retreated to the back of the fireplace. When approached it assumed a typical attitude of defense, preparing its talons for action and snapping its beak.

An Owl in Our Chimney

By HARRIET BURKHART

Photographs by the Author

ONE NIGHT in mid-October, as I was preparing for bed, I heard a rustling noise in my bedroom fireplace. Absently glancing in that direction, I met the large-eyed gaze of an *owl*! He was clinging to the inside of the firescreen, with pinions wide and ear tufts prominent—a gray phase Eastern screech owl.

As I approached my unexpected guest, he retreated to the back of the fireplace, where he immediately assumed the typical owl attitude of defense, throwing himself back on his wings exactly as though they were arms, freeing his talons for action. He also started snapping and clicking his beak with as much menace as such a diminutive predator could muster, while puffing out all his feathers to make himself look as formidable as possible.

By the time I got my camera and flash, the visitor had settled down on top of the logs, where he remained with eyes stubbornly squinted while I tried a couple of exposures. When my daughter tried to pick him up, however, he flew to the top shelf of the bookcase and perched on top of the books like Poe's raven, hunched over so that he could watch us. Presently, by dint of much scrambling, the owl managed to wedge himself into the small space behind the books, where he spent the next hour with only the very tips of his "ears" visible. If anyone came into the room, however, the big eyes quickly came into view above the books, and solemnly watched what was taking place.

Meanwhile I got out the proper size of band and pliers—for what bird bander would pass up such an opportunity!—and put on gloves for good measure. But our visitor proved to be much more tractable than the only other owl I had handled, a young barred owl I raised after its parents were killed. So I decided to try one more picture, this one on a lower shelf of the bookcase, where there was a niche for our guest among the books. He had trouble getting a foothold on the slippery enameled surface, but soon settled back in the corner and sat for his portrait with great aplomb, watchful but not unduly alarmed. Even the flash made him blink only once or twice.

In fact, I was the one who lacked confidence when it came to getting the stiff band around the thickly feathered tarsus. The band looked impossibly small. I have no pliers with a hole large enough to take a size 5 U. S. Fish and Wildlife Service band and close it in a perfect circle. So I had to use an ordinary pair of pliers with extreme caution, so that the band would neither overlap nor bite into the feathers. The owl lay quietly in hand during this procedure and afterwards actually seemed to enjoy gentle stroking of his head and back, for he closed his long-lashed, feathered eyelids and relaxed, leaning slightly against us. He also readily accepted and swallowed small pieces of

raw beef liver. I think he was probably very hungry, for I am sure he had spent the day sitting unobserved in the fireplace. Several times during the preceding night I had heard noises to which I had paid scant attention, since I, like most country dwellers, am well accustomed to white-footed mice in my waste baskets. How long he had been in the chimney I have no way of knowing, but the miracle is that he was able to get down into the small fireplace at all, with the damper partially closed.

About midnight we installed the little fellow in the barn in a large rectangular cage, in which we had placed a piece of gnarled driftwood. He lost no time in perching, sitting slim and tall. In the dim light his yellow eyes opened wide, with the pupils large and dark, very different from the huge, limpid, brown eyes of a former occupant of that cage, the baby barred owl. I wondered again, as I have so many times, whether the barred owl is still alive, for around the little lake resort where I live owls are far from popular. They are the innocent victims of stupid prejudice on the part of not only the summer people from the city but many of the local residents, who are actually alarmed if owls hoot close by in the woods at night. The innumerable unfortunate superstitions that have grown up around owls through the centuries are responsible. It is astounding that these old wives' tales are still believed in this enlightened age, but many people really believe that owls are harbingers of misfortune, or even of death.

The next morning, when I tried to feed the screech owl before leaving for the day, he kept his eyes as tightly shut as his beak. Plainly he had no wish to be disturbed at that hour, in broad daylight, and did not touch the raw ground beef I left in his cage. I discovered that even when his eyes seemed to be closed he could still see, for his head turned to follow me when I circled the cage. But in the early evening, when I tried another feeding, the owl was again wide awake, extremely alert, wary and active. He turned his back to me, spread his amazingly wide gray wings like a mantle, and then brought his head completely around, facing me in that disconcerting contortion so

To live up to the tradition of the owl for wisdom, the visitor, by way of the chimney, is posed in a bookish surrounding. While the photography was going on the bird sat for his portrait with great aplomb, watchful but not, apparently, unduly alarmed by what was taking place. Even the flash made him blink only once or twice. Below, the owl guest poses on the shoulder of the author's daughter, Cynthia, who engages him in a one-sided conversation.

natural to owls. This time he objected, with beak and claw, to being handled, but took his raw beef all the same.

When I put him back, he resumed his nimble maneuvers around the roomy cage, until, in order to examine more closely the intricate and beautiful barring of his wings, I turned the beam of a flashlight directly on him. He quickly threw out both wings and quavered one soft, clear note of thrilling tone quality—in pitch a perfect C, the one above Middle C on the piano. Once again he made this exquisite sound before I went on up to the hayloft to set mouse traps in the hope of catching a proper owl meal. I knew that owls swallow small animals whole and later eject from the mouth the skin, bones, teeth, and other indigestible portions, all done up in neat little packages. In the case of the barred owl I found that this process takes several hours, and only once in a whole summer's observation did I actually see him bring up a pellet from his throat one day while I was feeding him.

The next day, with the help of a young friend, I tied a string to the bird band and set the small owl in the crotch of an oak sapling at the edge of our woods for the final pictures. Only once or twice did the bird make any attempt to take off, and then flew sluggishly. (I have since learned that all screech owls are slow fliers, which is one reason they have to hunt by night. They can see perfectly well in the daylight, but I did notice that this owl always squinted the eye toward the sun, making it impossible for me to get outdoor pictures with both owl eyes fully open.) The owl's flight was, of course, noiseless because of the tapering of all the flight feathers into a hair-like fringe, which offers a minimum of resistance to the air. A chickadee is an audible—almost noisy—flier compared to any owl.

Perched in a tree, the owl assumes a rakish, or, at least, quizzical look.

By this time word had gotten around to a number of my former Junior Audubon ers that I had an interesting visitor, and five or six of them, of assorted ages from eleven to fifteen, appeared on the scene, two on horseback with a collie dog in tow. Pandemonium promptly ensued. Genghis Khan, one of two Siamese cats I tether on clotheslines because of the birds, went to the top of a Norway maple and had to be retrieved before he hung himself. The only calm individual in the whole gathering was the little screech owl. He seemed to accept all situations like a philosopher, sitting unperturbed on the shoulder of one of the boys, while the only girl present fed him raw beef liver. He ate eagerly and seemed to swoon with pleasure when she stroked him. The children were interested in the fact that, like all members of the owl family, this one had a facial disc, although it is not nearly so prominent and face-like as the pale one of the barn owl, for instance. I could well believe, watching the small owl with all these youngsters, what I have so often heard and read that screech owls are easily tamed and make delightful pets. This is certainly not true of all owls. Our baby barred owl never became really tame, although he did come to tolerate our attentions in the course of time.

By this time the other Siamese had caught a chipmunk, although on the leash. I put it in the owl's cage, not knowing whether he would tackle such an overwhelming offering, but wanting to give him one really satisfying meal before I turned him loose. Screech owls ordinarily eat small creatures, such as mice and shrews, insects, snails, crayfish, reptiles, etc., with only occasionally a small bird. The screech owl itself sometimes serves as a meal for one of the large owls, I have heard.

When I returned an hour or so later in the early evening, the owl was holding bloody shreds of the chipmunk's flesh gripped tightly in his talons against the driftwood perch. He was also rocking a little from side to side and crooning contentedly to himself six notes in a definite pattern. The song—for such it certainly was—started, like the call note I had heard before, on the C above Middle C and in the same long, sustained quavering whistle. But now it was followed by five shorter descending *chromatic*

notes—the A natural above Middle C, G sharp, G natural, F sharp, and F natural. Over and over he repeated this song, with scarcely opened beak and slitted eyes. Presently he raised the whole thing two tones, to E natural instead of C.

I sat in the dusk beside the owl, entranced by the beauty and strangeness of the song, and wondering how this little singer could possibly have deserved the harsh, inappropriate name of *screech* owl. As for its scientific name, *Otus asio naevius*, what a name for one of the smallest and most lovable of our North American owls! It is not even especially descriptive, since the first two words have the same meaning—one in Greek and the other in Latin—horned or eared owl, of which there are several other species. The third name, *naevius*, signifies having a spot, mole, or blemish, of all things, and must be intended to refer to the many lovely streaks and other subtle markings that make up its plumage. But whatever his name, of one thing I am sure: I shall never forget this particular little owl and his engaging and endearing ways. May his tribe increase!

★

Window upon Dark Land

By DANIEL SMYTHE

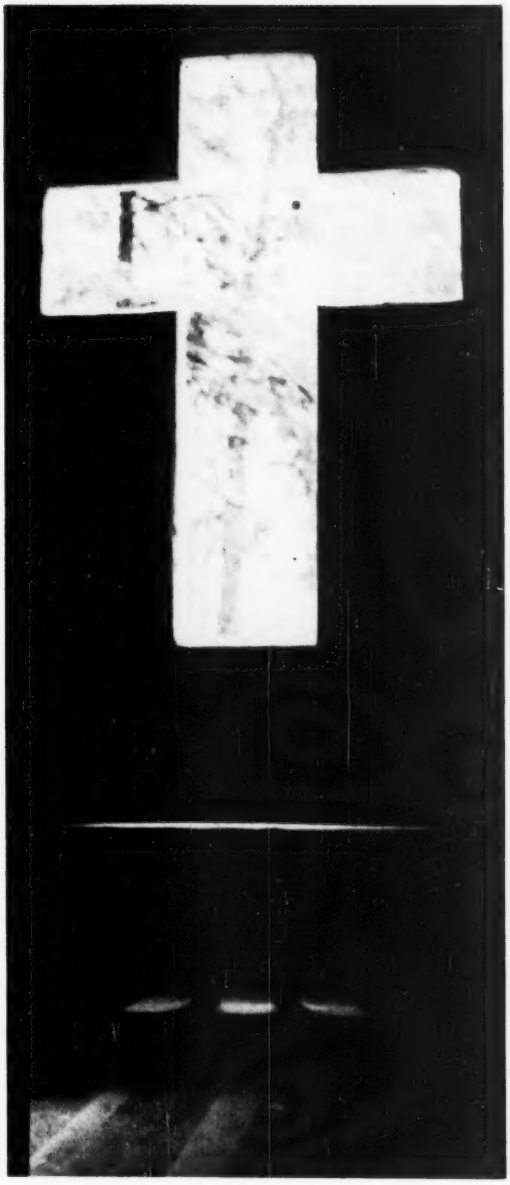
So much is being done out there
As earth's great side is slowly turned.
So many whispers rule the air
Beyond whatever may be learned.

Closed are the petals and the wings
But dew is gathering on the thorn.
Within the dark and secret springs,
The day is waiting to be born.

★

What wonderful thoughts are born at dawn beside still waters. Whoever has stood there to watch the mists arise knows the peace of mind that comes at that time. The sounds of night are stilled for a brief moment, and the noises of the day have not yet begun. **Theodor Bank, II**

Little Chapel in the Pines



By P. H. D. SHERIDAN

Through the plate-glass cross in the chapel may be seen the virgin white pines, although when this photograph was taken, they were obscured by a heavy snowstorm.

PHOTOGRAPH BY JACK MOORE

IN THE late summer of 1953 an elderly gentleman walked slowly among the majestic trees in the Hartwick Pines State Park, near Grayling, Michigan. This is the only stand of virgin white pine left in the Lower Peninsula of Michigan. After a while the man sat down and rested on a bench, enjoying the cathedral silence of the forest. A doe and her fawn, quite tame since they are protected in the park, munched on green foliage nearby.

That afternoon, Leonard Jensen, superintendent of the park, received a strange request. If arrangements could be made with the State, the old gentleman, who asked to remain anonymous, wanted to pay for and build a nondenominational chapel, deep in the forest, where others who enjoy Nature at its best, might pause and gain spiritual strength.

Permission to build the chapel was readily secured, and two of the most skilled builders with logs in northern Michigan were engaged. Both of them were well along in years, actually retired, but they pledged that this, the last log building they would ever construct, should be a lasting monument to the craft they brought from their native Scandinavia fifty years ago. Experts who have examined the building proclaim it to be perfect. A razor blade could not be slipped between the expertly fitted logs. The floor, of aged oak, is pegged with black walnut.

No decorations mar the chaste simplicity of this little chapel. Behind a log rail is a huge white pine board, two inches thick, into which has been hand-carved "Nature's Prayer" consisting of more than 600 letters. Walnut stain brings the raised carving into bold relief, and the prayer reads:

"Our Heavenly Father, Creator of all that is Nature,
We humbly come to you in the midst of Nature's splendor,
To thank you that as Americans we are free
To worship as we please, work as we please
And move about as we please to enjoy all that is Nature—
Its mountains, its hills, its valleys, its lakes,
Its streams, and the living things that dwell therein;
We pray unto you that someday the world may be at peace
And all men be free to enjoy Nature's abundance.
We ask you in the name of the Lord Jesus Christ
That we be guided to protect this priceless heritage
Which we as Americans are privileged to enjoy."

No park attendants will stand guard in the building. Visitors may stay for five minutes or an hour. No sermons will be preached and no collections will be taken up.

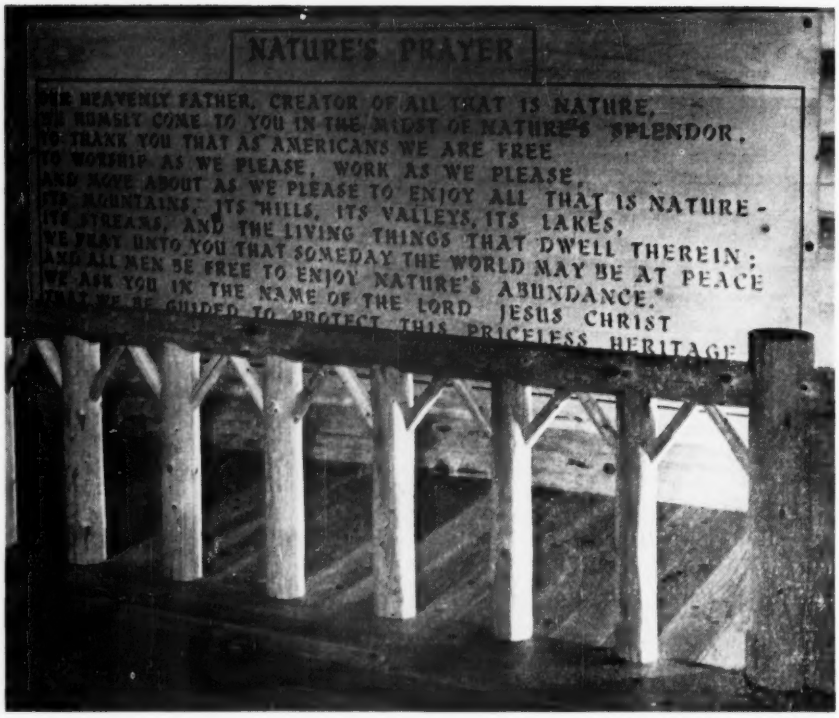
At the nave of this Little Chapel in the Pines is a huge plate-glass Cross, through which may be seen the lofty pines in the background, a sermon within themselves.

As a concession to the thoughtless who might be tempted to carve their initials into the beautiful white pine logs of the Chapel, Mr. Jensen hit upon a novel scheme. Outside of the chapel is a large white pine board. Above it is an invitation for visitors to carve their initials on the board, and thus save the Chapel.

Hartwick Pines State Park is in Crawford County, in the center of the highlands of north Michigan. It is about seven miles northeast of Grayling on State Highway M-93, 112 miles from Bay City and 166 miles north of Lansing.

The Park was presented to the State of Michigan in 1927 by Mrs. Karen B. Hartwick, as a living memorial to her husband, Major Edward E. Hartwick, who lost his life in the First World War. With an area of 8676 acres, this is the largest State Park in the Lower Peninsula of Michigan.

The principal feature of the park is the forest of virgin white pine, the only such stand left in lower Michigan. In a vast region that was once covered with fabulous growths of white and Norway pine, a tract of eighty-five acres somehow escaped the lumberman's axe. It is now preserved for public inspiration and so that people today may at least see what the great forests looked like before their ruthless destruction before the end of the nineteenth century.


NATURE'S PRAYER
ITS MOUNTAINS, ITS HILLS, ITS VALLEYS, ITS LAKES,
ITS STREAMS, AND THE LIVING THINGS THAT DWELL THEREIN;
AND ALL MEN BE FREE TO ENJOY NATURE'S ABUNDANCE."
WE ASK YOU IN THE NAME OF THE LORD JESUS CHRIST

PHOTOGRAPH BY JACK MOORE

The hand-carved prayer in the east nave of the Little Chapel in the Pines, at Hartwick Pines State Park in Michigan. Below are some of the virgin white pines that are preserved in this reservation in the center of the highlands of northern Michigan.

MICHIGAN DEPT. OF CONSERVATION PHOTOGRAPH

Lofty white pines dominate the virgin forest, specimens more than four feet through and reaching heights of more than 150 feet above the ground, with straight trunks free of limbs for half their height. Interspersed among the pines are the lordly hemlocks, oaks and other forest trees.

The largest tree is a white pine named the "Monarch." It has a height of 155 feet, a diameter of 51 inches, and is free of limbs to 74 feet above the ground.

Also in the park are a log memorial building, lumberman's barracks, and blacksmith shop in which are kept relics of the roaring lumbering days. Of interest are several of the great "wheels" under which logs were swung for transportation.

In all the middle West there could be no more fitting or beautiful a place for a Nature's Chapel than at Hartwick Pines. Here in the deep forest, just as it has stood for hundreds of years without a tree being touched by man, will come visitors who will pause for a moment and gain tranquility through Nature at her best.

On June 20, 1954, in the late evening, nearly 200 Nature lovers gathered at Hartwick Pines for a brief dedication ceremony of the chapel. Among the notables present were Gerald E. Eddy, director, Michigan Conservation Department, and also a representative of Governor G. Mennen Williams. Since the official opening of the chapel, hundreds of people have reverently visited this little shrine.

That Curious Worm— The Leech

By EDWARD LINDEMANN

Photographs by the Author

Leeches feeding on a scrap of meat. The oval one, top left, is in walking position as seen from above.

IF THERE is one water animal, smaller than the shark, that is particularly regarded as anathema and called hard names, it is the leech. Its habit of living on other animals' blood seems particularly unpleasant to us, yet it is only what we ourselves do, in part, when we sit down to a juicy steak. And precisely because the leech is a bloodsucker, it is helpful as well as harmful to man, for its salivary gland provides hirudin, an anticoagulating chemical used in surgery. It is also slightly helpful in destroying harmful insects. Even its esthetic value was recognized in the early 1800's, when its often pretty markings were copied in fabrics for women's clothes. Although often a nuisance, the leech is one of the most interesting of the segmented worms known as annelids.

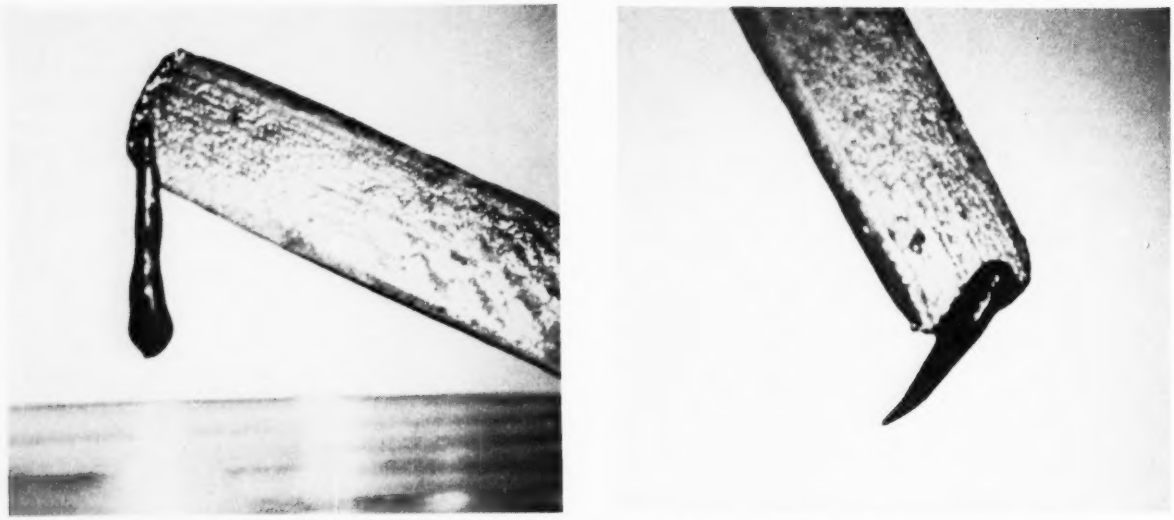
Leeches are found everywhere but on deserts, high mountain tops and in polar lands. They are plentiful in polar seas, however, as well as in temperate salt and fresh water, being parasites on many different fishes. In warm, wet climates some leeches are amphibious, some even exclusively land-dwelling.

Although not much of a pest to man in easy-going climates, the leech in the hotter countries is a serious problem. In the Near East and India, the young of some leeches live in wells and springs. Animals dipping their mouths in for a drink will pick them up inadvertently, and human beings using the water without disinfecting it will suffer too. These leeches fasten themselves inside the nostrils, sinuses and air tubes of humans and other animals and cause hemorrhage, as well as obstruction of the passage of air. In the sinuses the leeches can cause death, and India has an impressive death rate from this cause. No leech is poisonous, but its bite can, of course, open the skin to an infection, just as can a mosquito bite. The bite is seldom felt, and takes a while to heal, since the hirudin prevents clotting.

Leech in a jar of water, about twice life size. The rear sucker clearly shows. The long white mass in the body consists of eggs. A few days later these were laid in clusters of about sixteen eggs each.

Land leeches, too, are a danger in the East. They are found on the ground, on tree trunks, foliage, flowers, and rocks. These enter the clothing easily and persistently. The land leech, *Haemadipsa*, about an inch long and very thin, will drop on human beings from trees "like rain," as it has been vividly described. They may be as numerous as fifty leeches to the square yard in Ceylon, where they will attack a person literally by the hundreds if they have the opportunity. These leeches are thin enough, when foodless, to go through the eyelets of shoes, or between the meshes of a closely woven stocking. The British parasitologist, Dr. F. M. G. Stammers, recently found, however, that a cheap chemical, di-methyl phthalate, used in cream form on the skin and shoes, repels these creatures.

In the course of looking for a preventive, Stammers



Leech acrobatics—hanging by its front sucker and then dangling by its rear sucker.

made some interesting tests with the tropical leech. He found that contact with any warm object causes it to assume a sucking position; it will follow even a jet of warm air. So it seems reasonable to deduce that body temperature is one factor attracting a leech bite. A 50 percent reduction in the light falling on a leech also brings it to attack position, so apparently a man's or animal's shadow is another attraction to it. Aside from skin temperature, it is thought that there must be a specific chemical in the skin that has an attracting property, although Dr. Stammers was unable to extract one.

Although not nearly as serious a pest as tropical leeches, those of temperate climates do get in the way of human beings indirectly by destroying edible fishes. Some fishes, in return, eat leeches; yellow perch and lake trout especially like them, and they therefore make a good bait for these species. Turtles, frogs, frog eggs, snails and worms are also victimized by leeches, and sometimes each other. On a frog the leech will move to the thinnest skin, as at the groin, regardless of on which part of the body it first landed. It may grip a snail's shell to get at the animal's flesh, and even curl its body around the snail's for a better grip.

Members of three of the four leech families have no teeth at all, unlike the type formerly sold in drugstores to draw out blood from bruises. These are the *Ichthyobdellae* ("fish leeches"), *Glossiphonidae* ("tongue-siphons") and the *Herpobdellidae* ("reptile leeches"). All of these draw in blood by means of a long tube, the proboscis, which is kept within the neck until prey is at hand; then it moves out and pierces the victim. Having acted as a weapon, the proboscis becomes a pipe through which the blood is sucked in, much as a human being—if you do not mind the comparison—sucks up a soda through a straw. At the same time hirudin descends from a gland in the neck to keep the blood in a condition for easy withdrawal and digestion.

During the drinking operation waves sometimes run along the body, but the reason for this is not established with complete certainty. Some biologists think that in the leech—as well as in nematodes and other water worms that thrash about—the motion serves the purpose of distributing food and oxygen throughout the body. Just why some worms should have to go to all that trouble, while others get their swallowing and respiration "done for them," so to speak, is one of the thousands of unsolved mysteries of biology. The blood enters the digestive sacs, which spread out from the central sac like side-streets from a highway. Here it may be stored for as long as a year, being digested gradually, if the leech is sexually mature. The intestine itself is considerably smaller and shorter than the digestive sacs.

There is no heart in a leech, four pulsating veins taking its place. The blood receives oxygen through the skin, except in rare cases such as the Branchellion leech, which has what amount to gills outside the body. The skin is divided into numerous rings across the body, from head to rear end up to as many as two hundred of them. Being a segmented worm, it has interior divisions, also, but these do not correspond to the external rings; true interior segments number about thirty-three. Light-sensitive ocelli, or eyespots, run in rows along the length of the animal, some leeches having as many as ten of them. Other leeches have two clearly defined eyes on the head. At each end of the body is a sucker, the rear one considerably the larger. The skin is cast now and then. A main cause of death in aquarium leeches is lack of plants or wood on which to rub off the old skin and the lubricant of the skin.

Baby leeches come from eggs, which mature and hatch outside the parent's body. They are laid in sacs, together with an albumen food; the Clepsine leeches cover their clusters of eggs with a transparent

Six leeches in a plate. The two at top center are curling into new positions. The long one looks something like an earthworm, but its suckers, among other things, definitely identify it as a leech

fluid which hardens on them. The parent often undulates over the eggs, presumably to supply more oxygen. The young usually resemble the parents in form. Each mature animal is both male and female, and they copulate at a time of large feeding.

The medical leech is impossible to obtain today in any modern drugstore, but can probably be bought here and there in backward communities. The main reason that the leech is no longer a doctor's tool is certainly the possibility of its infecting the wound it makes. However, most people consider this worm unpleasant looking, and that is surely a second reason. Finally, the medieval and eighteenth century medical practice of frequently drawing blood in illness has passed away. Leeches, as well as various "cupping glasses," were formerly so widely used by doctors for squandering their patients' blood that the popular word for physician was "leech."

These leeches belong to a family that includes the only land-living leeches in the United States; these latter can be found in garden soil and feed on earthworms. *Hirudo medicinalis*, the medical leech, however, is collected from ponds. Transferred to an aquarium, it may live as long as twenty years. It has three lime-and-chitin "teeth" within its front sucker, and it is the notches of these efficient little tools that make a Y-shaped cut in the skin, leaving a deep and permanent, although small, scar. The leech was usually applied by putting it into a narrow bottle, tail end toward the bottom, and then inverting the bottle on the skin. If it showed no interest in biting, a little sweetened milk or a bit of blood on the skin soon changed its mind. Salt was sprinkled on it to make it detach itself.

Let us look at one type of toothless leeches, *Clepsine modesta*. We find them under stones, branches and old boards in a pond. (In winter leeches can be found among wet leaves at the edge, and even inside ice.) They can be scraped off without harm by using thin cardboard or soft wood. In taking them home we make sure to take along an extra jar of pond water, for chlorinated tap water is bad for small pond animals —at least until it has stood about a week to lose its chlorine. On the walls of the jar we see one of these whitish-tan bits of protoplasm, about one-quarter-inch long, begin to travel. With its hind sucker firmly adhering to the glass, it stretches out to about three times its ordinary length and plants the front sucker on the glass. The rear sucker immediately lets go, moves forward and takes a new hold. Thus *Clepsine* suggests something from the insect kingdom—the inchworm. (This could hardly be said, however, of a certain Chilean leech that measures two and a half feet in length.) The hold the annelid takes is always a firm one, and in the case of leeches only an inch or so long, I have pulled at them, without dislodging them, until I had to stop for fear of injuring them. Of the leech it can be said very accurately that it goes when it gets good and ready.

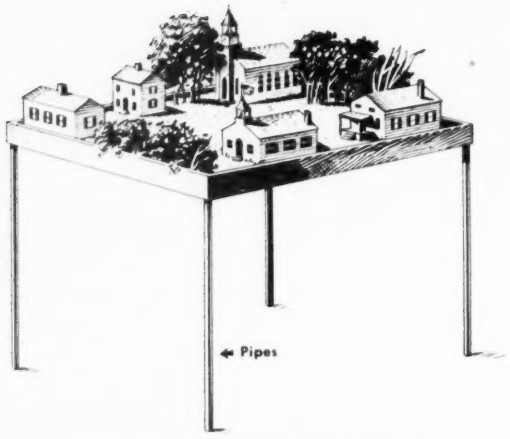
There is one exception to this, however. If it tries to travel on the underside of the water's surface film, as snails and flatworms often do, the leech gets nowhere. I have watched a *Clepsine* try over and over to do this in order to get from the side of its jar to a piece of meat in the middle. It planted its rear sucker on the film, then, as soon as it moved to plant the front sucker, the rear one slipped. The creature's gyrations—aided, apparently, by capillary attraction—landed it right back on the wall. After a good deal of this it decided to go on glass all the way and was soon sucking at the meat contentedly. I think it is safe to use this adverb without being considered anthropomorphic!

When we drop a piece of meat into the jar the juices of it will diffuse through the water and attract the Clepsines from all directions. If the feeding takes place in a little water on a (Continued on page 388)

The Bellport Birders

By GLENN QUILTY

Illustrated by Garnet Jex

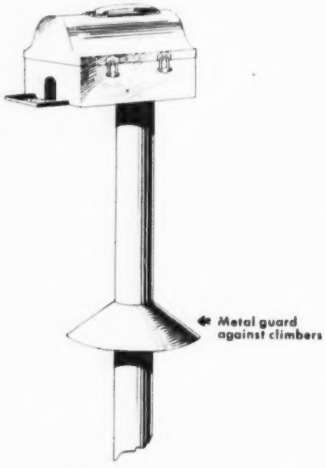


A town of bird houses and growing plants

RECENTLY I have been traveling widely, giving Nature talks and lectures on my boyhood friend, John Burroughs. On these field trips I have met with many local groups of bird watchers and lovers of birds. Each club visited has its own specialties and individual ways of attracting our winged friends. But the most unusual of such individuality is, I believe, to be found in a small town on the New England coast.

Bellport has many unique features that insure its value as an informal bird sanctuary. Extreme peace and quiet reign among white old houses set in spacious grounds abundant with blossoming vines and wineglass elms. There are no factories. Some fishing is done. Streets are too narrow for fast traffic; occasional horses and buggies are seen. It is a place where old families have remained since Pilgrim days, and it is a harbor for retired folks who like the absence of a technical world. No liquor is sold in this place; there are no theaters; restaurants are small and dignified. The town lies between the sea and low, green hills, calmly serenaded by birds of land and ocean.

When The Bellport Birders engaged me for a talk I knew that I would be enriched by my contact with them. They number about one hundred, and have been in operation almost seventy years. Many, who started in the early days as children, are now in their eighties. But youthful vigor and interest in birds remains unabated.



Workmen's tin lunch box observation post

I drove up to the little, white Congregational church with a flourish and stepped inside. A member conducted me to the front, where I sat waiting a few moments. The president had not arrived. Presently she came in, a tiny lady of eighty-two, erect, nicely dressed. But most unusual was her companion. A large macaw, brilliant in his long plumage of red, yellow, and green sat casually on her shoulder.

This exotic note in such a community was typical of the attitude of this group. They had their own ideas about birds and put them to direct use. The macaw eyed me intently and seemed to listen with great attention to my remarks. Later we were introduced, and he extended a cordial claw to me in most human fashion. His owner invited me to stay a few days to observe the methods and activities of the Birders, and I accepted happily.

Picture window feeding station

My hostess lived in a large, saltbox house set in spacious grounds. All about were bird-helps and attractors. A fine bath was made of a huge log, which had been hollowed out to a shallow depth on top. The lawn sprinkler was trained on this daily, and a small hole gave drainage. A small lily pond had a bird-sized bridge arching it, and it was placed conveniently to a handsome wistaria vine for quick escape if danger threatened. I watched a procession of finches and chickadees, orioles and robins traverse the little bridge joyfully.

On windless days a hanging bath, made of a round, shallow, terra-cotta platter, hung on wires, was placed in a low tree and seemed popular. And there was one attached to the side of the house, a narrow pipe drip-

ping gently down into it and draining off to another bath directly below, which overflowed to the ground. The birds exulted in this two-layer idea and it was a fine sight to see the splashing creatures. Many were banded, and had returned to this place season after season.

Here, too, I saw dust-baths. Three low-sided boxes, each a yard square, were placed close together. One contained earth dust, another sea sand, a third fine gravel. The sparrows jostled around in these with glee, and I was told many other species did so, too.

At the rear of the house was a large picture window overlooking colorful gardens. Instead of a single-shelf feeding station, there were six shelves, each a foot square, placed in a circular fashion around the window. At all times, winter and summer, these platforms were a busy gathering place for hungry flyers. Suet in mesh bags was fastened to the shelves, and little walled boxes, anchored securely, dispensed crumbs, grain, weed seeds, and peanut butter.

Quilty bird wheel feeding station

This arrangement later suggested to me a bird wheel. I put similar shelves around the rim of a bicycle wheel and mounted it on a post. If balanced correctly it will revolve in a slow manner; birds, used to the motions of trees and feeling safe through long association with certain surroundings, will perch, eating and enjoying the ferris-wheel ride. The shelves are level at all times through the use of gimbals, much as a ship's compass is kept level.

I visited other members of the club. In one garden I saw a well-dressed scarecrow complete with broad-brimmed hat. Suet was fastened to the shoulders and hands and hung from the hat brim, which was stiffened with wires. Through the years birds had become used to this figure and would occasionally perch on human figures working in the garden. The member concerned would, at times, dress in a way similar to the scarecrow. With his face shielded by a light, pliable screening he could observe, at closest range, his little visitors. During my visit I saw him fairly covered with birds.

One woman had several ordinary workmen's lunch-boxes placed on fenceposts. Each had an opening the right size for certain birds, and the top could be easily lifted for observation of eggs, baby birds, and for cleaning. She also kept a large dead tree on her property as a roost and gazing-post for feathered creatures. Some days the branches resembled a school of intent, reciting pupils standing in rows.

Another lady member had a town of bird houses. It was situated on an eight-foot-high platform and boasted several dwellings. They were realistic in every exterior detail, even to a church and school. The bird population fluttered about the little streets; one or two made nests, but the rest were day visitors mostly. Doughnut crumbs, chopped dog-biscuit and the like kept interest high in this project. An inquiring, combative bluejay would sometimes frighten smaller birds away, but generally the place was a popular roost for finches, bluebirds, robins, and many others.

I saw many single bird-houses, some with musical devices that seemed to intrigue winged visitors. One had a tinkling glass Japanese wind, or Aeolian, harp attached. The tenant would perch in his doorway eyeing it with cocked head and replying in bursts of song. Another had small bells around the roof; goldfinches from a nearby thistle patch circled this, listening and brushing against the bells ever so lightly. Still another had a revolving weathervane so constructed as to give off a soft musical sound in the wind.

One Birder was fascinated by hummingbirds and had filled his grounds with honeysuckle vines to attract them. And he placed bright red ribbons at the mouths of little glass tubes filled with honey and water. These were fastened near windows for watching. And, through a very wide front doorway left open, he could induce his tiny visitors into the house by setting about vases of honeysuckle alternating with little trays of the ribboned tubes.

All these people have worked for years to earn he confidence of bird friends and they are well repaid for their patient efforts. I recall that Thoreau wrote how ennobled he felt, how touched with honor, when a bird lighted on his shoulder as he was gardening. And John Burroughs once called them "our feathered relatives." The Bellport Birders feel this way about them, it is certain.

When it came time for me to leave the little town the Birders invited me to the little white church to a musicale. I sat there looking with admiration at the youthful, interested oldsters. We had to wait a few minutes for the president, as before. Presently she entered with the bright macaw on her shoulder. She was a living symbol of our bond with the world's greatest flyers.

CHICKADEE

By RAY ROMINE

He likes our insects! Let him sup.
While I decide which end is up,

A Tarantula Pet

By CHARLOTTE OFFEN

There seems to be a certain admiring affection in Howard Baker's expression as he looks at his pet tarantula, Sybil. We are not sure whether Mrs. Baker cherishes some reservations about the spider.

IT CANNOT be said that Howard Baker, biology teacher in the El Dorado, Kansas, junior high school, would not hurt a fly. But it can truthfully be said he would never harm a tarantula.

"Tarantulas aren't nearly so dangerous as they are rated," Mr. Baker says. "Our native tarantula, *Dugesiella hentzi*, while poisonous enough to kill its prey, is not so poisonous to man. The tropical tarantula is said to be deadly poisonous, however. Tarantulas, like all spiders, are useful to man. They destroy untold numbers of harmful insects, being especially fond of grasshoppers."

Mr. Baker has had an opportunity to study the tarantula, thanks to a female he has kept in his home the past four years. He calls her "Sibyl," and says that she "is gentle as a kitten. She never tries to bite me or Mrs. Baker, no matter how often we handle her."

And handle her they certainly do, not with metal pincers, but with their bare hands. Lifting the spider from the gallon tin can that has been her home now for four years, Mr. Baker said:

"Tarantulas object to strong light. Sibyl proves this by placing her forelegs over her eyes when exposed to bright artificial light. I believe their nervous system is upset by it."

Sibyl huddles cozily against the palm of either Mr. or Mrs. Baker's hand, seemingly to enjoy the comfort of the warmth she finds there. Who knows, perhaps she senses friendliness there, too. But no amount of coaxing can persuade friends of the Bakers to touch her.

"She's used to your handling and might detect the difference in our hands," they argue. Mr. Baker merely scoffs at these remarks.

Mrs. Baker once watched Sibyl in the process of shedding her old dress.

"Why, it was the most amazing thing! She literally stepped out of it, much as a woman would step out of her dress," she exclaimed.

One thing in particular Sibyl refuses to do, however, is to eat before the public eye. Only in the darkness and privacy of her home will she pounce upon the cockroaches, flies, or grasshoppers supplied her. When exceedingly hungry she will eat as many as three large grasshoppers. In winter, during which the tarantulas in their native state hibernate, Sibyl will eat a few cockroaches, if they can be found. In eating she merely extracts the body juices from her food, and seldom eats the carcass. She will leave untouched any food she has not killed herself, no matter how long she has been without food.

Mr. Baker enjoys placing Sibyl on the floor or on a table top in order to display the graceful manner in which she handles her eight legs. And the action of her two spinnerets at the rear of her big round abdomen, which is the size of a plum, is a delight to behold. Whenever she maneuvers a turn, one or the other of these spinnerets will gracefully touch the surface.

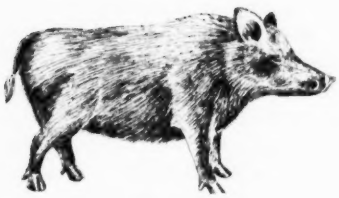
"Ah, but you should see her wearing her new dress," Mr. Baker exclaimed. "Why she's beautiful, black and soft as velvet. Later on her hair turns a reddish-brown, and wears off in spots from rubbing around in the can. That is what caused the bare spot surrounding her spinnerets."

Friends of the Bakers declare the tarantula is so used to Mr. Baker that she recognizes his voice and knows when he calls her name. Watching this huge, hairy spider cuddle in his hand, perform before the camera, cling to glassy surfaces with the suction cups on her eight feet, makes one feel this is true. She never attempts to run away or hide in any instance. Placed on a table, the tarantula may go as far as the edge, but then feeling empty space beyond, she will instantly stop, or turn back. She takes water from a small glass dish kept inside the can, and, for so small an animal, she requires a great deal. When thirsty, she will go to her fountain, and once, when it was empty Mrs. Baker found her curled inside the dish.

During summer when the Bakers leave on trips, they put Sibyl into the car and take her along with them.

"Anyone attempting to pilfer our car, and finding Sibyl, together with our dog Bonnie, would run for his life," laughed Mrs. Baker.

Captive tarantulas have been known to live as long as twenty years. Perhaps Sibyl will make a record.



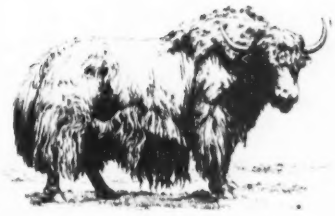
WILD BOAR

Wild or Tame

By E. LAURENCE PALMER

Illustrated by Louis Agassiz Fuertes, E. M. Reilly Jr., Ellen Edmonson and Hope Sawyer

This is the seventy-seventh in NATURE MAGAZINE'S *series of educational inserts.*

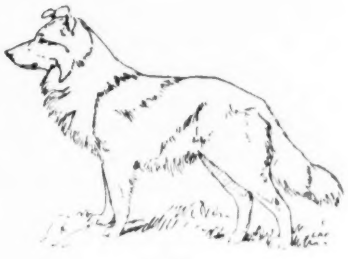


YAK

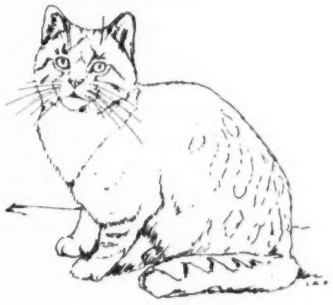
MIDSUMMER is vacation time, travel time, rodeo time, circus time. The national parks, state parks, and city parks are sought by city folks trying to make the most of a few weeks of vacation, even if they wear themselves out doing so. They see a circus sign, a rodeo announcement, or just a cage beside some roadside enterprise. The motorist stops to see what is doing, and to buy a sandwich or a few more gallons of gas. It is both sad and surprising to see how many of those living from the traveler's dollars use wild animals as bait. A cage with a bored bear, a nervous raccoon, a disgusted eagle, a vindictive bobcat, or a mangy coyote may often be a more successful stop sign than a clever rest-room notice, a last-chance-to-get-yours-at-bottom-prices sign, blatant neon signs, or incongruous television antennae, giving gentle reminders of the comforts left behind at home.

It is with some of the experiences of vacationists that relate to wild, or semi-domesticated mammals, that this special insert is dealing. Who can say that a dog or cat left on its own is wild or tame? Who can say that a mustang or a steer in a rodeo corral is being tamed or is going wild? Who can say that a bored, caged bobcat or a sleepy circus animal is completely subdued and resigned forever to its fate? Failure to judge these animals wisely may often lead to unpleasant or positively dangerous situations.

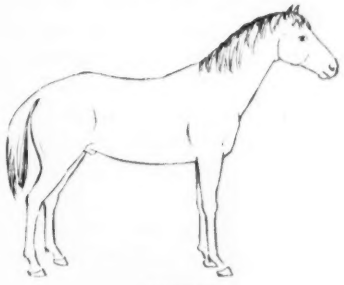
Not long ago, at one roadside zoo, the cocky head of a city family attempted to show his family how smart he was by blowing a cloud of smoke suddenly into the face of a peaceful-looking llama. Characteristically, as well as with justice, the animal reacted by throwing his stomach contents directly from his mouth over the person of the offensive human being. Fortunately, a good sense of humor saved the situation for all parties concerned, but sometimes such incidents are more dynamic. A chained coyote may know the length of his chain more exactly than a pestering visitor. A caged cat may strike more quickly with armed claws than one expects. A semi-tame bear in a national park may see no reason why he should take bacon a strip at a time when, with a flash of the paw, he may take the whole hunk, and badly scratch a human hand in the act. A crazed bronco may injure a bystander with a flying hoof, or crash into a crowd with mutually distressing results. I have personally witnessed or experienced all of these examples, except that of the llama, and I know people who have been involved in incidents of that kind. Such experiences do not always lead to happy public relations between man and the so-called "dumb animals."



DOG



CAT



HORSE

ORANG-UTAN

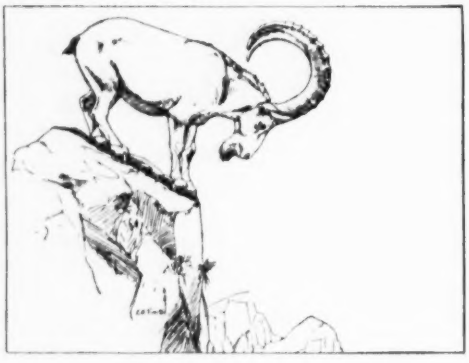
Whose fault is it if an elephant in a circus resents being given a lighted cigarette instead of a peanut? Whose fault is it that an abandoned cat goes wild and kills more game in a week than the average hunter may kill in a year? I know a place, not more than a couple of miles from my home, where each year ducks used to raise good-sized families. Then some squatters set up shacks, brought in cats to keep down the rats, and now it is fortunate if any ducks leave their nests alive because of the appetites of the neglected cats.

How many summer tourists take along the family dog or cat only to find that, when it is time to start the day's journey, it has wandered off into the hills? Why let the cat upset the whole vacation schedule? It is easier just to go on and leave it to its own resources!

How many times do tourists find

GORILLA

CHIMPANZEE



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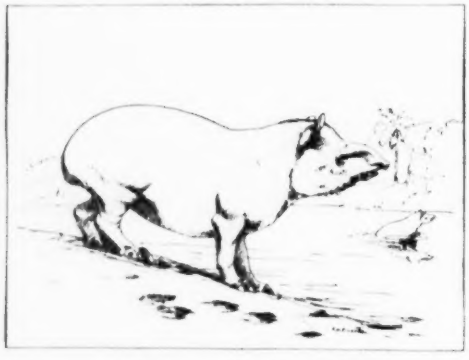


SOUTH AMERICAN TAPIR

young rabbits, woodchucks, deer, coyotes, foxes and other animals and take them into "protective custody," only to abandon them weeks later, unfit to make their own way in the wild, and unwary of man. How frequently do those who live near wild country induce wild deer, raccoons, squirrels, and other animals, even including bears, to come to a convenient point so that their feeding may attract tourist trade. Are these influenced animals wild or tame, and how should they be treated? If they cause an injury to a tourist is this because the tourist is so foolish that he is not alert with a wild animal, or that the wild animal has been induced to lose its fear of man? Who is responsible for such situations? Think this matter over carefully, and draw up your own pattern of conduct for your vacation time.

One satisfaction that comes from writing these inserts is represented by the resultant fan mail. Frankly, I like the nice letters that have been coming in recently, but I also like those that raise questions that may have more than one right answer, and even those writers who, through their own misinformation, may have taken issue with statements made. I well remember one well-known biology teacher who wrote a vitriolic letter about sheep ticks not being insects. He never had the good grace to admit that he was wrong, or to offer even a mild apology. A recent insert gave data on bird behavior that probably was not representative of some parts of the country, even though it is accepted as valid in standard ornithological literature. I learned something from correspondence with this individual. What will happen as a result of this insert I do not know, but I am sure that there will be some who will resent even the implication that a cat is ever a wild animal. Others will question whether a rhinoceros can ever be trusted at all, or that a gorilla can ever be anything but a nightmare come to life. The fact that, in 1949, there were in the United States 25 gorillas that were living, or had lived, amicably with human beings for a portion of their lives, would be entirely ignored by such persons. Some of the tragedies of these associations between human beings and the higher apes come when it is necessary for the safety of the human that the relationship be broken off, since the ape does not realize the strength of his physical powers.

Within the year I was entertained at the home of Dr. Claude Leister of Stroudsburg, Pennsylvania. A friend brought in a pet chimpanzee, whose name and picture have appeared frequently in a number of magazines. It is notable that meeting this animal induced, in part, the writing of this insert. At any rate, when the chimp came into the room she went from person to person and politely offered her hand. Once this circle had been completed, she went the rounds again, and, with greater familiarity, climbed into laps and got cheek to cheek. This completed, she settled down to renewing her acquaintance with Dr. Leister, who knew how she would react to certain sounds and types of behavior. Soon the two were having a wonderful time together. The literature tells us that a chimpanzee is probably the most intelligent of all the apes and, at its best it approximates the intelligence of a four-year-old human being. My experience with this animal confirmed what I had read in the books.

At other times I have had a young gorilla in my arms, and a number of monkeys, but in all cases I have been warned not to offer any sudden resistance lest the animal might become frightened. I have seen what some of these young animals can do, and it is obvious that fright might result in instinctive defense. The treatment they will accept from those whom they know would not be accepted

with similar grace from strangers. And what happens between man and the higher apes may well be duplicated in the relationships between man and the so-called dumb animals.

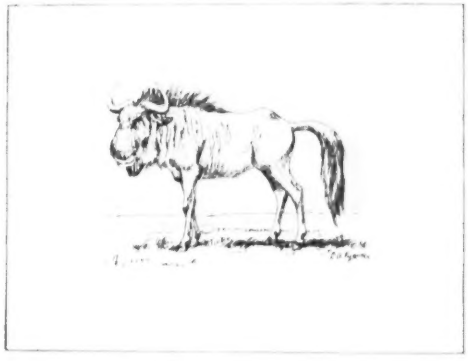
It is difficult to decide just what constitutes a dumb animal. Most of us would agree that turtles, for example, seem to be rather dumb most of the time, but even they know when to duck to safety under water. We may think that dogs and cats are less dumb than cows and pigs and sheep, and that most of our neighbors, and at least some of our relatives, are more intelligent than dogs or cats. I even admit that, until the economic crash of the twenties, I was decidedly dumb about financial matters, and possibly that subsequent to that experience I may have been ultra conservative to my own disadvantage. But the point is that some of us can learn from experience, and we cannot deny similar ability to some of the lesser animals with whom we may associate. What happens between man and the animals that are wild, tame, or semi-domesticated depends in part, and to a large part, probably, on what human beings like you do. Such episodes may well figure in your vacation experiences this month. I hope that any experiences will be mutually happy.

If, as a farmer, you work with dumb animals, you know that some farmers can get more work and other satisfactions from their animals than can others. It pays such men to know how to get along with animals. Contented cows are reputed by some to give superior milk.

If you are a lover of dogs or cats you know that they react differently to different persons, and you can, probably in some instances, discover the reason why. If you are interested in dog training classes you get fun in matching the adjustment you can make with your pet, and the adjustment others make with theirs. You learn how to improve that understanding, and that usually the best adjustment comes through appreciation of kindness rather than through satisfaction of hunger, or from fear of punishment. Sometimes training may come best through a judicious combination of these. And what happens with you and your dog may well happen between you and a wild, tame, or semi-domesticated deer. There have been reports that understandings of mutual value have been established between man and such a ruggedly wild animal as a jaguar. Kipling, in his inimitable and obviously fantastic "Jungle Books," went so far as to suggest even closer relationships in understanding between man, wolves, panthers, bears and tigers, even though there he found difficulty in suggesting a friendly common ground between man and tiger.

I once knew an Iowa squirrel hunter who tried to impress me with his love of Nature by saying that he once watched two squirrels for more than an hour before he shot them. Understanding him required some mental gymnastics that have still left me rather dizzy, but the experience that took place more than three decades ago set me to wondering and examining my own philosophy of life. It helped more than I like to admit. It is obvious that some of the staunchest defenders of wildlife got their initial understandings of the nature of wild beasts by hunting them. Many deserted the gun for the camera or the field glass, or, bored with the success with a firearm, decided it was more fun to use a bow and arrow. Still others, like myself, found ultimate satisfaction in just getting along with the critters without injury or even annoyance to either party, or even without the use of special equipment. For my part, I get as much relaxation from sitting down for an hour in my 8-acre wood-lot across the street from my home (Continued on page 368)

MANDRILL



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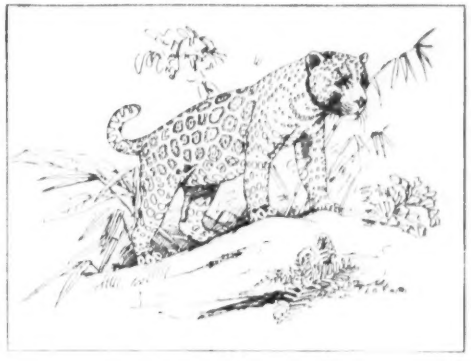
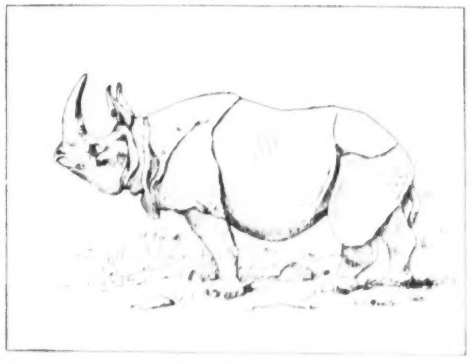


JAGUAR



RHINOCEROS

COMMON NAME SCIENTIFIC NAME	DOG *Canis familiaris*	DOMESTIC CAT *Felis catus*	JAGUAR *Felis onca*	ORANGUTAN *Pongo pygmaeus*
DESCRIPTION	Collie breed stands 20 to 40 inches at shoulder and weighs to 60 pounds. Long-haired, graceful and dainty. Highly intelligent. Black, brown or tan, but usually with whitish throat. Some forms are all white or bluish-gray. Head long and narrow. Ears moderately large. Legs about 1 foot long. Tail long-haired. Eyes round.	Length about 2½ feet, including 7-inch tail. Shoulder height to 9 inches. Fur soft and fine. Toes with sharp retractile claws. Ears erect and forward-pointing. Snout short. Five toes on each foot, normally. Mouth narrow but canine teeth large and sharp. Except in Persian the pupil is a vertical slit.	Length to 79 inches, on average. Male to 7½ feet; female to 6½ feet. Shoulder height to 28 inches. Weight around 250 pounds, although some reach 300 pounds. Tail 2 feet, 2 inches long. Basically tan with dark brown to black spots made up essentially of circles of smaller spots in 7 to 8 side rows.	Adult male to 4½ feet high when erect, with fingers nearly reaching ground; 7 feet, 3 inches between tips of extended arms. Weight to 200 pounds. Body broad and clumsy. Legs weak but arms strong and long. Head narrow, with broad face, bulging snout, open nostrils, small red, hair-free ears; 2-inch beard; no tail.
RELATIONSHIP	Order Carnivora. Family Canidae. Dogs have been associated with man since before history, undoubtedly, and through history in many parts of the world man and his dog have been in the picture. Sometimes the switch to or from the wild state has been due to the man, and sometimes to the dog. Collies were developed in Britain.	Order Carnivora. Family Felidae. Developed in Eocene times from *Miacis*. In modern times is represented by many breeds, including Manx tailless cats developed from Oriental stock; Siamese from African jungle cats; long-haired Persians from Asiatic cats; European tabbies, probably from European wildcat and Egyptian cat.	Order Carnivora. Family Felidae. Ranges in one or another form from Texas south to Paraguay. Is the largest of the American cats. Ranges in jungles, near streams, or in open country, but probably at its best in heavily jungled areas. It does not favor cooler highlands in its general range.	Order Primates. Family Simiidae. Native of Borneo and Sumatra where it lives for the most part in trees in low marshy country, coming to the ground only uncommonly. While the orangutan sits with feet turned inward, the chimpanzee lets them hang down, and the gorilla sits with knees drawn close to the chest.
REPRODUCTION	Puppies numbering 6-12 are born to the average female 59-63 days after she mates. Puppies are blind at birth, are unable to hear for 10-12 days, nurse until 1-2 months old, and become biologically independent and capable of breeding within a year. Female in heat once a year. Life span to 22 years.	One to three kittens are born blind and helpless 62 days after adults breed, each weighing about 2-3 ounces. Male gives no care to young. Either sex highly promiscuous at breeding time. Female in heat 1-3 weeks. Male is usually larger than female in any breed. Iris of adults usually yellow; of kittens, blue.	Pair definitely breeding in January. 2-4 cubs born about 100 days after the breeding, and both parents assist in care and rearing of young. At 6 weeks young are size of domestic cats; at 1 year shift for selves, and at 3 years may breed. Life span probably about 20 years.	Live in small family parties of parents and 2 to 4 young, sleeping on quickly prepared platforms until late morning. Feed at midday. One young, born 8½ months after breeding takes place, is cared for by both parents. Life span is known to extend at least 26½ years in captivity, but is probably shorter in wild.
ECOLOGY	Dogs are inclined to run in packs, to obey a leader, whether it is a man or another dog. Whether it naturally is more or less intelligent than a cat, or a better hunter, is a matter of discussion and will continue to be so. Dogs will feed on plants or animals, and can go long periods on little food.	Catch prey by surprise and sudden dash, somewhat favoring fish, but eating birds and mammals avidly. Individuals known to have killed 4 rabbits in a day, 100 chickens in a season, and 40 turkeys in a few days. Food of Baltimore alley cat about 6.7% rats, the average killing 28 a year. Can see with little light.	Can climb trees to capture monkeys and can pursue prey in water, over open country or through dense vegetation. May feed on cattle, horses, sheep, pigs, tapirs, alligators, turtles, and fishes. Is not a match for the smaller more agile cougar. Has been known to attack, kill and eat human beings.	Food is fruits, particularly the durian from which the spiny outer side is removed to reach the juicy pulp inside. Also feed on nuts, tender plant shoots, young bamboo. In captivity, and probably in wild, will feed on fishes and shellfish. In captivity known to develop a strong taste for fermented liquor, with usual results.
ECONOMY	Domestic dogs may breed freely with the related wolves and coyotes, but it is doubtful if breeding with foxes is likely. The most peaceful house dog, when running with a pack, may behave as a wild animal with respect to sheep and other animals, and free-running dogs may destroy much game, spread rabies, and be otherwise dangerous.	Many cats are turned loose in summer when owners take vacations, and these may become feral at the expense of local wildlife. Baltimore alley cats account for 20% of the rats needed to be killed to keep rat population under control. Known to carry rabies. Fur known to commerce as genet.	Pelt is valuable and fur of excellent quality. A great enemy of live stock of all sorts, and because of this is sought relentlessly by professional hunters in cattle country. On the trail it is noisy giving a coarse coughing "uh, uh, uh." May be shot, but expert hunters commonly use the lasso. Untamable.	Lower in the animal scale than the chimpanzee and gorilla. Can be trained to imitate habits of men in eating, dressing, smoking and drinking, and because of droll appearance makes a most popular zoo animal when so trained. It shows appreciation of attention, and has considerable mechanical ingenuity. Not very healthy.

CHIMPANZEE *Pan satyrus*	GORILLA *Gorilla gorilla*	MANDRILL *Papio mormon*	WILD BOAR *Sus scrofa*	COLLARED PECCARY, JAVELINA *Dicotyles torquatus*
Erect, to 4½ feet. Weight to 170 pounds, the males the larger. Body broad, not deep. Head broad. Mouth large. Muzzle light colored, prominent. Nose blunt. Ears large. Arms shorter than in other apes. Largest finger the thumb. Thumb of foot long and powerful. Stands with feet widespread and with knees bent.	Male, standing erect, measures to 5 feet, 6 inches. Arm stretch to 9 feet, 1 inch. Weight 300-600 pounds. Female smaller. No tail. Body bulky. Chest to 20 inches wide. Mouth wide. Eyes small. Ears close to head. Nostrils large. Toes opposable with strong thumb. Lips thin. Face, hands, and feet, black.	Length to 2 feet. Shoulder height to 1 foot, 9 inches. Tail to 2 inches, naked beneath, held curved over back. Weight to 110 pounds. Nose protuberant with 6 convolutions. Beard prominent. Body hair long and silky. Hair about mouth, white. Body dark brown. Underparts yellowish. Hind parts purple. Face frill greenish-gray.	Shoulder height to 40 inches. Weight to 400 pounds. Like domestic hog but with shorter body, stouter legs, longer head. With 4 developed toes to a foot but only 2 touch the ground in walking. With formidable tusks (canine teeth) a pair to a jaw, curving, with lower pair projecting to 4 inches. Blackbrown.	To over 3 feet long. Shoulder height to 16 inches. Weight to 46 pounds. On back, about 8 inches in front of tail, is a navel-like scent gland that gives off a stinking scent that hunters can detect at several hundred feet. Blackish-brown with yellow-brown and white on flanks and collar-like white stripe. Hind-toes, 3.
Order Primates. Family Simiidae. Native of equatorial western and central Africa. A forest dweller that spends most of the time on the ground, usually in troops of considerable size. Seems to like association with man if treated with consideration. Have been used as pets for over 300 years, if caught young.	Order Primates. Family Simiidae. Ranges through central Africa, with lowland gorilla near Gulf of Guinea in rain forest. Mountain gorilla near eastern Belgian Congo. Probably formerly ranged across Africa. Made famous by sympathetic studies by Carl Akeley in Tanganyika region.	Order Primates. Family Cercopithecidae. Found in western Equatorial Africa. Larger and heavier than the related drill. Both are baboons and baboons are confined to Africa and southern Arabia. Others include sacred baboon or dog-faced baboon of Ethiopia and Sudan; chacma of southern, and yellow of western Africa.	Order Artiodactyla. Family Suidae. Native of Europe and Asia but now mostly confined to forested highlands. Established in Africa along north coast, in some wilder areas in the United States and elsewhere sometimes being introduced as an object of sport. Favors damp, moist, marshy forests or boggy plains.	Order Artiodactyla. Family Tayassuidae. Native from Arkansas and Texas to Patagonia, but now found in United States mostly in Texas, southern Arizona and New Mexico. Favors softer soils into which it can root. Related white-lipped peccary differs from collared peccary in being primarily a woodland species.
One young born 9 months after breeding in nest guarded by male. At 9 days weighs 2¼ pounds and to 15 inches long. Female becomes sexually mature at 5½ years, male later. Life span of captive animals has been to 40 years, which is probably in excess of some wild free animals. Adults have intelligence of 4½-year human.	One young born 9 months after breeding of adults. Young walks more erect than do adults. At 4 years may weigh 140 pounds. At 7 years reaches sexual maturity. Life span may be to 35 years. Clan is apparently dominated by adult male, and may include several less dominant males and a larger number of females. Total to 15.	Baboons commonly live in troops of 15-20 animals ruled by large males. Mother carries young on back. Have been bred in captivity. Young, about size of half-grown kitten, are slightly built and dull gray without green sheen of adult, and have black faces without convolutions. Life span known to reach 26 years.	May run in small herds. Male boars defend female sows and young. Shoats are born 112 days after breeding, often over a dozen to a litter. Young wild pigs have light lengthwise stripes for a few months and can bear young at 1 year of age. May live to 30 years in wild state, with tusks increasing in size.	Probably polygamous with one, or, uncommonly, two young, born 112-116 days after mating at any time of year. Young well-haired, spotted or striped, follow sow in 2-3 days and join herd in 1 month. Herd is known as a sounder. Young commonly born in hollow log or a hidden cave.
Food largely fruits and vegetables gathered frequently at night, with a group often being noisy while at work. Gentle when unopposed but when resisted may be violent. A zoo animal exhibited a pulling strength of 1200 pounds on a dynamometer. Can be taught to sit at table, dress and do many tricks.	Food, most plants and only a few animals. Principally bananas, cabbage palms and similar succulent plants. Young animals are affectionate. Do not appreciate power as they mature. Generally good natured and intelligent in captivity. Walks on all fours rolling from side to side and shuffling with head erect and eyes forward.	Food: roots, fruits, shoots, small animals. In captivity eat almost anything. Captive young are timid and will not thrive with other monkeys of same size. Young jump actively in contrast to slow-moving adults. All are better suited to life on ground than in trees. Are powerful, mean, disgusting, cunning.	Usually when annoyed take cover, but may charge enemy suddenly and violently with effectively slashing tusks. Both sexes will fight to protect young. Food where available is nuts and other vegetable material but may include insects, snakes, mice or even fishes. Nocturnal, seldom feeding before dusk. Wary and shy.	Food almost any plant or animal found available, but favors nuts, grain or vegetables. In numbers can defend self against a dog but a trained dog can kill an isolated individual. Jaguars are important enemies. A sounder of javelinas can drive almost any living creature before it or destroy it. Speed may be 11 miles per hour.
May be destructive to crops but ordinarily does not annoy man unless provoked to action. Used for study of behavior to help in understanding man. Is probably the most intelligent of the apes. Cannot be found in sufficient abundance to be of use in experimental medicine, as are some of the more primitive monkeys.	Known to man since fifth century B.C. and until recently hopelessly misunderstood. When angered may beat chest and roar and when cornered or to protect family may fight, but is rarely the aggressor. Can be most powerful fighters. At night males stay on ground but females and young stay on tree platforms. Cannot swim.	Highly destructive to crops and can drive unarmed human from an area. Can catch and hold dogs until they can be given an effective bite. May raid poultry coops, grain and fruit stores, and vegetable supplies. Reports of holding children and women captive are probably distorted.	Flesh is superior food when animals have had good food. Wild boars are hunted by hounds, which bring them to bay in dens or other shelter, where the boars are shot or netted, speared or knifed, depending on skill and sportsmanship of the hunter. When hunted on horseback a wild boar may tear out horse's intestines.	Considered a game animal but now almost wholly destroyed in United States. Food is of little value to man and unless scent gland is removed quickly has no value. Hide has some value. May be highly destructive to crops, but may also kill poisonous snakes, and rattlesnakes. Untrustworthy as pets.

COMMON NAME SCIENTIFIC NAME	ALPACA *Lama pacos*	AFRICAN BUFFALO *Bos caffer*	YAK *Bos gruniens*	IBEX, WILD GOAT *Capra ibex*
DESCRIPTION	Slightly smaller than a llama, standing about 4 feet high at the shoulder, with the top of head to $5\frac{1}{2}$ feet above ground. Wool long, dark brown to black, often covering animals' legs but head and neck may be much lighter. Ears commonly erect. Hind quarters high. Back long. Sheep-like or camel-like.	Height at shoulder to 5 feet. Length to 9 feet. With horns that nearly meet at base and may measure to 6 feet around the curve from tip to tip, this being about one-half the length of the combined horns of the Indian or water buffalo. Brownish-gray with body scantily covered with hair that may be black. Powerful.	Domesticated yaks may weigh to 1200 pounds, being usually larger than average domestic cattle but smaller than wild yak. Shoulders are high. Legs are short and stout. Hair, black to brown, with great ruff at breast and a long fringe along flanks and underparts that may reach ground. Horns, broad, curving, pointed.	Shoulder height, to 3 feet. Length to 5 feet. Weight to 200 pounds. Both sexes are horned, the horns being substantial, to 59 inches long, weighing to 30 pounds, curving backward in almost a circle, slender tipped but sometimes with nubbins on outer side of curve. Fur rough, thick with mane and beard on bucks.
RELATIONSHIP	Order Artiodactyla. Family Camelidae. Found in herds as domestic animals in Bolivia and south Peru. Domesticated from the wild guanaco, which was larger than the vicuna, with the larger domesticated guanaco being the llama and the smaller the alpaca. Cannot survive climates of England or Australia well.	Order Artiodactyla. Family Bovidae. Native of eastern Africa from Abyssinia to Cape Colony. There are two African buffaloes—the Cape buffalo, which is large and black as described above, and the smaller Congo buffalo, which is to $3\frac{1}{2}$ feet high at shoulder with base-wrinkled upturned horns. Brown Abyssinian, and gray Senegambian races.	Order Artiodactyla. Family Bovidae. Native of mountainous Asia, and Tibet, in particular, where temperature may remain below zero for long periods. Cannot do well in warmer regions. Do not need lush vegetation to prosper. The domesticated yak is probably a smaller race of the wild yak. Seen in some circuses and zoos.	Order Artiodactyla. Family Bovidae. In one form or other known over wide mountainous range in Switzerland, the Pyrenees, Caucasus and Abyssinia. Abyssinian ibex is *C. walie;* Himalayan, *C. sibirica;* Alpine, *C. ibex;* Arabian, *C. sinaitica*, but all favor high, rugged, mountainous country. Bucks favor higher country than the does.
REPRODUCTION	Breeds every other year, usually in July, with young born 11 months later. Llamas may mate with alpaca but the cross is sterile. Only one young born and it is covered with soft, creamy brown, short wool, which makes it most attractive. The young make popular pets. Life span to over 10 years.	Bulls may have enormous horns with span of to 45 inches and with each to 36 inches around curve. May run in herds of 30 to 50, but sometimes, when protected, in herds of over 100. Calves are born 10 months after breeding, which may take place at any time of the year, with both adults defending young and the herd.	Bulls wander in groups of to 3 most of year, while cows and calves stay together in larger protective herds. Calves born $8\frac{1}{2}$ to 9 months after breeding takes place. May be dangerous to man, wolves and other enemies when protecting young or when wounded. Milk is exceptionally rich, and butter is excellent.	Bucks live alone except during breeding season. 1-2 kids born June-July, and a few hours after birth may follow the ewe over relatively rugged country. Kids are protected by ewe, who fights enemies or attempts to decoy them away from hidden young. Among the most sure-footed of all animals.
ECOLOGY	Food sparse grass and similar vegetation, and if succulent food is available, water is not needed. Hemoglobin of blood has higher affinity for oxygen than that of sheep or rabbits and number of red corpuscles remains about same at sea-level and at 16,000 feet elevation, while that of sheep drops.	Favors grasslands near water or where breezes may blow through trees, driving away flies. Feed from dusk to midnight, then chew cud and drink until dawn, then usually go into hiding for the day. Lion is chief enemy, other than man. When disturbed or wounded may charge, killing enemies by horns and by trampling.	With remarkable endurance and have been known to struggle through snow with loads for 6 hours over rugged country. Food, is largely coarse grasses. Protection is primarily with horns that may reach length of nearly 40 inches. May charge quickly even when wounded. As a pack animal is slower than horse.	May feed largely at night, or may come down hill in late afternoon to graze and retreat to highlands at daybreak. May feed on herbs or woody plants, lichens, or almost any plant material available. May be preyed on by wolves or bears, and young may be taken by eagles, but man is the most dangerous and serious enemy.
ECONOMY	Can carry 100 pounds as load. Flesh is good food for man. Each animal is sheared 1 or 2 times a year, yielding to 12 pounds of 2 kinds of wool, one long and coarse and other fine, lightweight and almost equal to that of Cashmere goat. Wool used for making superior blankets, coats and general fabrics.	A competitor for grazing with domestic cattle, a superior game animal, a dangerous antagonist, when tamed may survive in zoos and in captivity, but is never trustworthy like the Indian buffalo. May serve as reservoir for cause of sleeping sickness carried by tsetse fly to domestic animals and to man.	When free, feeds at night and in early morning. Flesh is excellent, though lean. Tongue and marrow favored. Hairs used in making ropes, tents and fabrics; tails as fly brushes, and are used as signs of rank by high officials. Make good but slow saddle animals where other animals could not go. Skins and bladders used.	Serve as excellent game animals in native areas and flesh has good food value, particularly in young animals. Will survive in captivity, but soon may lose fear of man and may enjoy bowling keepers over, apparently for the fun of it, or may jump on them, apparently to use them as a higher perch.

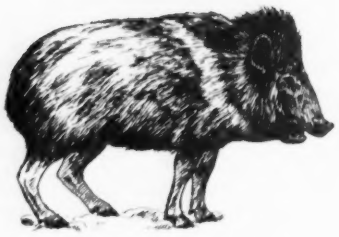
BRINDLED GNU, WILDEBEEST *Connochaetes taurinus*	CHAMOIS *Rupicapra rupicapra*	INDIAN RHINOCEROS *Rhinoceros unicornis*	AMAZON TAPIR *Tapirus americanus*	MUSTANG *Equus caballus*
Height at shoulder about 4 feet. Length, without tail, about 7 feet. Seems to have hoofs and legs of an antelope, body of a horse, head and horns of a bison. Horns are flattened at base in both sexes and curve upward and inward. Tail is like that of a horse. Heavy black mane on head and neck.	Length about 4 feet. Shoulder height about 2 feet. Weight to 90 pounds. Sexes superficially alike, but bucks usually larger than does. Horns rise 8-10 inches from top of head then turn backward and downward. Hair is close and long with a thick woolly underfur. Tail is short and stubby, but not naked.	Length from nose tip to tail base, $10\frac{1}{2}$ feet. Shoulder height to 6 feet. Tail to $2\frac{1}{2}$ feet. Single 24-inch horn of about same size in both sexes. Skin, blackish-gray, uniform, in folds forming shield-like structure over shoulders, haunches and around neck. Weight to 2 tons.	Length to 6 feet. Shoulder height to 3 feet or more. Dark brown to black, frequently tinged with gray. Has general appearance of a pig, but its nose has a suggestion of a short trunk as in elephants. Skin is relatively smooth. Eyes are rather small, the tail short and the ears relatively small.	Height varies, but usually between 13 and 14 hands (52-56 inches) at withers (base of neck). Body, short, deep, muscular. Neck of medium length holding clean-cut, alert head. Ears relatively small. Weight, about 800-900 pounds. With great strength, endurance and considerable intelligence.
Order Artiodactyla. Family Bovidae. Brindled gnu ranges through southeast Africa from Orange River north to beyond Victoria Nyanza in reasonable abundance. *C. albojubatus* is in British East Africa, and white-tailed gnu of South Africa is now almost exterminated over most of its former range.	Order Artiodactyla. Family Bovidae. Native of mountainous areas of Europe in French and Spanish Pyrenees, in Swiss Alps, and in Carpathians and Caucasus. Also established in rugged New Zealand. While it ranges in the open, it is inclined to favor upper stretches of the tree belt. Commonly found in flocks.	Order Perissodactyla. Family Rhinoceridae. Largest of the 3 Asiatic rhinoceroses. Native of the plains of India. Related Java rhinoceros, limited to Java, is smaller and gray with female hornless usually. Sumatran rhinoceros of Burma, Malay Peninsula and Borneo is still smaller, 2-horned and hairy.	Order Perissodactyla. Family Tapiridae. An inhabitant of the forested areas of the Andes, particularly Brazil, Paraguay and northern argentine. In Central America are found the giant tapir, or Baird's tapir, and the Dow's tapir that are brownish-black and former reaching 600 pounds in weight. Hairy tapir is found in Colombia and Ecuador.	Order Perissodactyla. Family Equidae. Developed from horses introduced into America possibly by Cortez in early 1500s, by DeSoto in Florida in 1539 mixed with escaped domestic horses subsequently. The bronco of s.w. United States is of Moorish origin; the Indian pony of n.w. U.S. of Norman.
Males and females both have horns, but the body of the female is usually smaller than that of the male, at least in the white-tailed gnu. Run in herds apparently dominated by males. Young are tamed relatively easily if captured early, but adults do not submit to confinement and may be dangerous.	1 to 3 kids born 153-210 days after bucks mate with ewes. Kid follows mother at 1 week, grazes at 10 days, nurses for 2 months, and becomes sexually mature at 3 years. May remain with does for 6 months, and may stay by killed mother. Years of greatest horn growth are as follows; 2nd, 1st, 3rd, 4th. Life span about 22 years.	One young born 19 months after breeding takes place, and young remains some time with mother. Otherwise rhinoceroses are likely to be most unsocial. Life span estimates vary from 25 to 50 years, with different authors and in different areas. An aggregation of rhinoceroses is known as a crash. Calf weighs 75-100 pounds.	Single young born 392-405 days after parents breed. Probably breeds every other year and life span may reach 30 years. Young are easily tamed and sometimes wander about South American villages in semidomesticated form. Amazon tapirs may breed in captivity but notes on reproductive story are meager. Young striped.	Family herd of 20-40 is led by single stallion. Young female is a filly; young male, a colt. Adult female, a mare, is in heat 5-7 days and after breeding bears in 11-12 months a foal, which in wild may breed at one year of age. Castrated colts are called geldings. Castrated adult males are stags.
Grazing animals of open grassland country. Can run at 50 miles an hour for short distances and apparently enjoy jumping, kicking and circling. Have excellent endurance, sight and ability to smell, great inquisitiveness but are inclined ordinarily to be ruled by the action of the group.	Killed extensively for flesh, which is tender and juicy; and for hides that make superior fine leather. Bucks usually live alone and weigh to 70 pounds. Can leap 23 feet and known to clear 13-foot wall. Keen sense of smell and of hearing. May make interesting pets when young but old animals may be dangerous. Need protection.	Food essentially plant material, commonly twigs and shoots of woody plants. Speed to 28 miles per hour, but charge may be sudden, unexpected, powerful and most dangerous. Enjoys mud baths to avoid insect annoyance. Has good sense of hearing and scent, but poor eyesight.	Feed on palm leaves, other vegetation including water plants. Love to play and roll in mud. Can swim submerged for 40 feet, coming up with only ears, snout and eyes showing. When excited gives highly pitched whistle. Prefers not to fight, but can charge and bite if necessary. Urinates directly backward and suddenly in flight.	Food wholly vegetation, preferably herbs rather closely cropped. Fight by use of heels, forefeet or teeth. Herd may form circle heels out in defense. In migration herds of over 10,000 have formed, with scouting small groups providing warning. In stampede may crush all ordinary enemies quickly.
Often serious competitors for grazing. Common prey of lions. Flesh excellent food and hides make good leather. Horns are used by natives in making tools. While wildebeests appear in most movies and books about Africa, and may be seen in zoos, there seems to be little literature about their life histories.	May serve as slight competitors for grazing, but can survive on small amount of forage. Hunters are interested in knowing that chamois rest at night, feed down hill until noon and uphill in afternoons. The animals will breed in captivity in parks or in suitable enclosures.	An excellent and dangerous game animal that should be preserved. Horn is considered a resistless love token and stimulant, and as such has high value to natives. Horn is not a bony structure, but is somewhat like modified hairs grown firmly together. Flesh is eaten by some natives, and dried blood an article of commerce.	Fore-feet 4-toed; hind feet 3-toed. Toes encased in horse-like hoof. Flesh is juicy and beef-like. Skin used in making reins and bridles but too hard when dry and too soft when wet for use as shoes. It has been suggested that because of strength it could be used as draft animal but would be undependable.	Greatest value as cow ponies because of remarkable endurance. Herds may lure domestic horses away but usually a "broken" wild horse remains relatively broken for life. Essential to man in cattle country for keeping herds together, branding and other care. Many killed for dog food and to eliminate competition.

(Continued from page 363)

without even a field glass as I used to get in hours with a shotgun. I admit it was a bit more fun when there were more than fifty gray squirrels there, but even then I felt it was not quite fair because those squirrels were being fed by a graduate student of mine who was studying their home life and general habits. Now I can see a few squirrels any time I go over there. I like to feel that sometime, through a sane program in conservation education, we may come to a point where man can get along better with his wild neighbors.

It is possible that in some areas and at some times surpluses may develop that need to be harvested, either by man or by natural predators, but I am willing to let other men do this work for me, and in some cases would prefer that the task be left to the natural predators. It was demonstrated in one park that two buck deer and four does, in five years, produced a herd of 160 animals, and that in another, one buck and three does in eleven years produced a herd of 250. It is believed that the productive capacity of one white-tailed doe is such that in ten years she and her offspring could produce a herd of 130 animals. These figures indicate that the reproductive capacity of many forms of wildlife is such that something must control the increase. How this may be done is in part your business, but remember the weight of the argument does not lie at either extreme of policy.

Just as we find sportsmen taking a prominent part in adjusting man's differences with wildlife, so we find circuses and zoos also participating. Zoo keepers are sometimes almost required to satisfy the public that some of the animals on display live up to their reputations for villainy. Circus performers are sometimes hard put to make a sleepy, lethargic, half-sick and thoroughly bored lion behave like a king of beasts. The public seems to demand action, and usually it is forthcoming, no matter what the cost. When vicious or thoughtless persons toss lighted cigarettes to circus or zoo animals they *invite* trouble. One valuable zoo animal once swallowed a tennis ball that was tossed to it and, being unable to digest or pass the ball through its digestive tract, died. How can *people* be so dumb?



PECCARY

CHAMOIS

CAPE BUFFALO

ALPACA

Rodeos are of course spectacular displays of conflicts between men and horses or cattle. They speak for themselves, but one of my most distressing nightmares has as its leading figure a horse that escaped from its tormentor, and, being blinded, dashed through a wire fence with mutually disastrous results. A few hours later I saw the horse standing quietly, and horribly torn, in a nearby stream. Somehow, ever since, my sympathies have been with the ridden not with the rider. It is hard to think that the future of the horse-man relationship probably lies more on the race track and rodeo than at opposite ends of a plow or of a pair of reins over the buggy dashboard. Not so obscure is the future of man's relationship with cattle, whose flesh, milk and hide exceed in value the labor the pioneer got from his team of oxen.

If you take a vacation this summer in eastern Pennsylvania let me suggest that, if you wish to see how at least one man has gone about helping people understand wild animals or semidomestic animals, you visit the wild animal farm run by Dr. Claude Leister, who was mentioned earlier in this article. In his interesting zoo you see few animals behind bars. Rather, you go behind the bars with the wild animals. When you go in, a few Sika deer, or some goats, may come up and get acquainted with you. At first you and the youngsters may be a bit concerned about what is going on, but eventually you will have a hard time pulling yourself and the youngsters away from the fun you are having. A couple of guanacos are likely to gang up on you and push you towards a slot machine, where a coin produces a graham cracker. You may think the cracker is yours, but if you can get it first you are lucky. You then step back and watch someone else have the experience, only to find that the seat of your pants is being gently nibbled by a sheep, a goat, or a donkey that wants you to do something for it. There is no danger in this experience at this wild animal farm, which is on route 611, just south and east of Stroudsburg, Pennsylvania. Here you can find the finest example I know of men, women and children adjusting their differences amicably between wild, tame and semidomesticated wild animals. Do not miss it if you can help it.

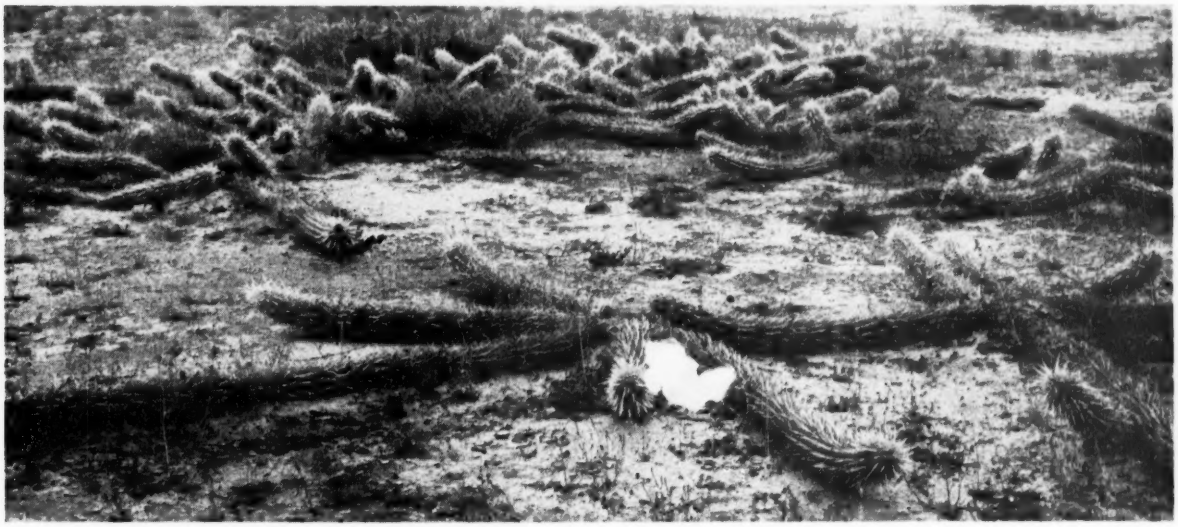
Of course there is literature that will help your understanding of the questions raised here. You can hardly read an issue of *Nature Magazine* without finding accounts of adjusted understandings between man and the lesser animals. The same would hold for such magazines as *Natural History*, *The Animal Kingdom*, *The Journal of Mammalogy*, *Audubon Magazine*, *The Journal of Wildlife Management*, and so on. Possibly, in a less understanding way and from a more one-sided viewpoint, you may read *Field and Stream*, *Sports Afield*, and *Outdoor Life*.

For my part I have found well worth reading at least three books treating the matter in a scientific way. These are Hamilton's *American Mammals*, Francois Bourlier's *Natural History of Mammals* and Noble's *Nature of the Beast*. The literature on apes and man is too abundant to be listed here but certainly should include Yerkes' work on *Chimpanzees*. Possibly some of you would like also to read Andrews' *Meet Your Ancestors*, and Needham's *About Ourselves*.

There is much semipopular literature in this field. Probably the most important in this area is Jack London's *Call of the Wild*, which is too well known to call for discussion. Then while you are at it you will want to get acquainted with *The Pacing Mustang* in Seton's *Wild Animals I Have Known*, and the dog "Wully" in the same volume, and still while you are at it do not overlook "Lobo" in the same book. Helpful, also, might be the stories of "Johnny Bear" and the pup "Chink" in *Lives of the Hunted*, also by Seton. If you wish to know more of the background of these stories, sometimes considered controversial, read about them again in Seton's *Trail of an Artist-Naturalist*.

For fanciful treatment of the subject go into your child's library and pick up and read those well-worn books by Kipling that you read yourself "when you were very young." I refer, of course, to the *Just-so Stories* and the *Jungle Books*. They and Seton conditioned many of us to what I think is a happy understanding of the relationship between man and the so-called beasts.

Outline drawings of subjects by Fuertes used in illustrating this insert are available on water color paper from Slingerland-Comstock Company, Ithaca, New York.



Creeping Devil Cactus

By ARTHUR L. CENTER

Outdoor Photographs League Photo
by Arthur L. Center & Laurence M. Huey

In lower California, on the barren wastelands of the Magdalena Plains, thrives an unusual and weird-looking desert plant. It is known as the creeping devil, or caterpillar, cactus.

The pale gray plant is made up of arms or branches, which resemble an armored octopus when viewed at a distance. Each elongated branch, which extends outward like spokes of a wheel from a hub, possesses a thick coat of sharp needles and is upright at the tip. The tip looks like the head of a caterpillar, and the wicked needles look like harmless hairs, which they certainly are not!

These cactuses usually are found flourishing in colonies. The arms vary in length from three to ten feet. The cactus will creep along the ground until it dies of old age. However, instead of the entire plant decomposing, only the oldest part of the arm near the center or heart dies. The same plant sets up a new growth system and lives on, thanks to the roots on the under surface of the plant that continue to creep.

What of the Magpie?

By GRACE V. SHARRITT

Photographs from the U.S. Fish and Wild Life Service

The black-billed magpie has both his good and his questionable points from man's point of view.

THE MAGPIE flew to the fence post with a mouse in its long, black bill. As the bird tore its dinner apart, two boys with rifles walked casually along the road near the yard. In Wyoming, the local ranchers were paying a five-cent bounty on each foot of a dead magpie.

Although the boys took aim, they missed, and the bird, still carrying its mouse, flew into a dense thicket of willows along the irrigation ditch. The boys strolled on, watching for other magpies upon which to practise their marksmanship. They believed they were doing a good deed, plus the extra dividend, of course, of pocket money. Magpies are considered pests in Wyoming.

Why is there a bounty on the magpie in some of our western states? What are the bird's crimes? Has this member of the same bird family as the jay and the crow been maligned unduly? Is the magpie a marginal predator; a bird whose good habits balance its evil tendencies?

Let us take a look at some facts about the magpie.

In 1947 a magpie and crow control program was initiated in several Wyoming counties in cooperation with the Wyoming Game and Fish Commission. While the State department does not have a direct bounty system on any predators, it does participate in various predator control programs administered by the counties, which handle all the details, the Commission paying one-half the cost.

Within four years a total of about 150,000 magpies were killed in bounty campaigns in various Wyoming counties at a total cost of $20,000.

Other birds that are unprotected in Wyoming are English sparrow, sharp-shinned hawk, Cooper hawk, goshawk, duck hawk, golden eagle, kingfisher, blue heron, great horned owl and crow.

Montana pays half of the bounty on magpies offered by sportsmen's clubs throughout that State. The bounty is paid on magpie legs, and is usually about 10 cents for each pair of legs. From May 1, 1952, through March 30, 1953, nearly $1400 was paid by the Montana Fish and Game Department in magpie bounties, a sum matched by various sportsmen's clubs. Hawks, owls, and eagles are unprotected in Montana, although no bounties are paid on these groups.

Utah does not have a special fund for the bounty on magpies. However, some organizations have paid bounty on special local problems. Birds unprotected in Utah are the magpie, sharp-shinned hawk, Cooper hawk, goshawk, prairie falcon and the English sparrow.

Idaho discontinued its bounty on magpies in 1950. Prior to that time the annual kill of magpies for bounty payment during the 1940's was approximately $11,000 for 150,000 birds bountied each year! Bounties, however, are still offered for the "pest" birds in local areas by gun clubs. No hawks or owls are protected in Idaho, nor are the raven, kingfisher, cormorant, or pelican.

Predator control of any kind is always a hotly debated question between conservationists, game management people, ranchers and gunners. This same rule applies to the bounty campaigns on the magpie.

Ranchers and sportsmen have no good to say of the flashy feathered magpie, which is charged with picking out the eyes of new-born calves, and robbing the nests of ducks of eggs and young. Biologists and naturalists believe, just as convincingly, that the magpie's extensive habit of eating injurious agricultural insects and rodents is to the bird's credit and should be scored in its favor in evaluating extermination campaigns.

There are two members of the large widespread family of magpies in western North America—the black-billed, or American magpie, which is found in the Rocky Mountain States, west of the prairies and north of the desert to Alaska, and the yellow-billed magpie, found west of the Sierra Nevada in California.

The North American magpie has many relatives in Europe and Asia, and its name is supposed to be derived from the French word Margot, a diminutive of Marguerite, which suggests the chattering of a talkative woman; and from the Latin *pica*, referring to the black and white coloration of the bird. The name of the magpie has also been said to have originated from the bird's habit of picking maggots from the backs of animals.

Lewis and Clark, the first to add the magpie's name to North American fauna, described the birds as familiar around camp, often snatching the hunter's meat while the game was being dressed. Indian boys used to capture the birds as pets, for magpies tame easily in captivity and make amusing pets.

Many are the legends, steeped in Old World folklore,

Four little magpies all in a row. In some States they are destined to grow up with man as their enemy.

about the magpie. Like any legendary subject, be it man or bird, some of the tales are true, some false, and many are based purely upon hearsay and superstition.

For the past eight years, I have been able to study the habits of the black-billed magpie in northwestern Wyoming. Some of the observations were disagreeable, while others have proved extremely interesting. As a whole, these observations have left this writer, at least, with the feeling that the magpie has many good traits that have not been advertised.

I have seen the birds pick out the eyes of helpless, sick elk, and perch on the backs of stock, and wild game animals, and pick open sores, until the animals, through weakness, would have died, or would have been devoured by other predators, had not man intervened. I have seen moose and elk infested with ticks, with magpies perched on their backs following the tick-infested animals wherever they went.

In areas where there are large concentrations of magpies, the birds do damage to the nests of waterfowl, as well as to the smaller nesting birds. I have seen magpies eating birds' eggs. But I have also seen wrens eating birds' eggs.

Friends of mine, who are neighboring ranchers, have told me grisly tales about magpies picking the eyes of the new-born calves, while the mother cow was giving birth to the calf.

Another friend, a forest ranger, said he was a bitter enemy of the magpie for its habit of picking open sores on his horses. He said, "I'd shoot any magpie on sight." And added, "The bird is beautiful, but it is evil."

One rancher told me how he killed a flock of magpies by baiting them with poisoned meat. He explained that the birds were a great menace to the birthing calves, and, as cow-ranching was his means of a livelihood, he had to do something. He said he did not have the time to go around destroying the nests of all the magpies on his ranch.

So the magpie is, and can be, a liability where the birds are in great concentrations. In some of the U.S. Fish and Wildlife Service Refuges, as, for instance, the Bear River Waterfowl Refuge near Brigham City, Utah, the nests and eggs are destroyed as a precautionary measure in controlling magpie depredations of the waterfowl nesting places.

Now on the credit side. The bird is also very active in cleaning fields of infestations of insects and rodents. Magpies also feed on maggots, or larvae, and flies that exist in carrion, thereby doing a good sanitation job. Arthur C. Bent says: "Improvement of the habitat by the magpie, if it takes place, is usually not noticed at all by people."

E. R. Kalmbach, biologist, formerly of the U.S. Fish and Wildlife Service, has made an extensive research on the magpie's food. His reports reveal that the food of the nestlings fed by the parents differed from the food eaten by the adults. He claims that insects made up the greater part of the animal matter fed to the young.

About three-fifths of the adults' food was of animal origin, largely insect food. He believes that the species is more highly insectivorous than any other common species of the crow family; that magpies doubtless have an important controlling influence upon local outbreaks of insect abundance.

Other naturalists have observed the association between nesting hawks and nesting magpies. They suggested that the magpies nested in the close vicinity of certain hawks, to benefit from a surplus of food from the leavings of the hawks.

Several years ago, when we were at the peak of a cycle of field mice, and they abounded in the ranch yard and fields, magpies were among the daily visitors hunting for the rodents, along with the hawks of various species, and the eagles.

The magpies' methods of awkwardly hopping like old dowagers about the fence rows hunting for mice were clumsy in comparison with the swift plunge of a rough-legged hawk, yet the magpie invariably caught its mouse, too!

I have seen magpies diligently working the irrigation rows of our fields in the summer, hunting for grasshoppers and other insects. Last May, when the waters

Studies of the food habits of magpies show that they account for the destruction of insect pests and aid in keeping rodent numbers in check.

from the irrigation ditch flooded our yard, these birds would perch on the lower wires of the fence and watch for rodent victims washed into the yard. The birds would take the mouse either to the fence post, or to a higher place on the ground, and eat it.

I supply a bird feeding tray the year around at a window of our house. Although the magpie is the most cautious bird visitor, and rarely comes to the board if I am in the room, it does come early in the morning and late in the evening.

A pair of magpies that have nested for six years in an old cottonwood tree across the field from our house, are regular visitors to the feeding shelf in nesting time. Better to observe the bird's feeding habits, I began throwing out scraps of meat, on the ground, several kinds of cracked nuts, boiled potatoes, cooked carrots, pickled beets, and bread. The magpies would eat white bread but no rye. They ate all of the above-mentioned foods, but would not touch cake, jam, or berries. They would carry off chicken bones!

At first he, or she, the sexes are alike in plumage, would pick the food from the ground and fly to the fence post. But as they became less afraid, they would eat on the ground near the door. I saw one magpie regurgitate its food on the ground, then pick it up, and fly across the field.

The magpies would not tolerate the ravens, which also liked to feed near the kitchen door. One magpie chased a raven all over the yard, until the raven, exhausted, came down on the ground to rest. The magpie rested too, but right at the raven's elbow!

However, there was other bullying among the birds that fed at the kitchen door! The robins chased the Brewer blackbirds, the blackbirds chased the Savannah sparrows, and the Savannah sparrows flew at the mountain bluebirds!

In the tree next door to the magpie's nesting domain, a robin nested! Nearby a pair of mourning doves nested also. In the fields were the meadow larks, and the blackbirds! The magpies may have stolen the eggs and the young of these song birds, but the same species return each year.

The magpies begin building new additions to their nest as early as March 4. The nest is an immense, disorderly structure almost completely concealed in the dense matted boughs of the cottonwood. It is roofed with dead branches. A tree surgeon would have made short work of this mass many years ago. But we keep it intact, mostly so I can spy on magpie activities.

On the seventeenth day of May last spring, I clocked the magpies feeding their young. I could not actually see the young without climbing into the tree, so I contented myself with watching from the car, which was parked beneath the tree. The birds were extremely wary, never uttering a sound as they flew silently to the tree, then hopped to a place where they could sort of slide indoors.

It was a windy day, and the tails of the birds swung like kites as they flew back and forth to the nest. Both birds fed the young. They carried no visible food in their bills, so doubtless regurgitated. The parents stayed only a second at the nest. There was a lapse of three to six minutes between feedings, as the birds searched the ground of the field for insects.

Finally the wind and the dust made me sneeze, and the parents became aware of my proximity. One scolded a warning cluck, but made no other sound, as it slid into the nest from another angle behind the tree. I waited twenty minutes but the birds would not return.

During the last week of May I saw four young magpies perched sleepily on a willow bush near the cottonwood. Two days later, on Memorial Day, I heard shooting at that end of the field, which is a town subdivision, and where the magpies roosted. I did not see the magpies again that summer.

What do you think? Has the magpie a case for its life? Has this beautiful bird, with its metallic blue-black coat feathers and a pure white trim, a chance to redeem itself by its good traits? Could not extermination campaigns be ended on all so-called predacious birds? Could not the nests and eggs be destroyed only in areas where magpies have (Continued on page 388)

Left, the magpie-plum combination makes a pleasing decoration on a porcelain bottle. Right, a naturalistic rendering of the traditional lotus-duck combination. Both pictures courtesy, Metropolitan Museum of Art.

Snuff-Bottle Garden

By MABEL IRENE HUGGINS

IF, DURING the Ch'ien-lung period (A.D. 1736-1795), a collection of snuff bottles had been sent to George Washington, he might have had a preview of many of the plants that were later discovered in China and brought to our attention by plant explorers. The Chinese flowers, shrubs, and trees that have been introduced into our country, have immeasurably enriched the beauty of our gardens.

Unfortunately the symbolic significance that the Chinese attached to those trees and flowers failed to be transplanted along with seeds and roots. However, we may gain a partial knowledge of some of them and their symbolism by even a brief visit to what we choose to call a snuff-bottle garden—Chinese snuff bottles that have as their decorations examples of Chinese flora.

There is no better place to begin than with the emblems of the four seasons—the peony for spring, the lotus for summer, the chrysanthemum for autumn, and the plum for winter. All four provide ornamentation for snuff bottles.

Even as far back as the T'ang dynasty (A.D. 618-906) it was the fashion to admire the peony. A poet of that period, Po Chu-i (A.D. 772-846), recorded the popularity of the peony in his day, and the crowds of people who went to the flower market, where they paid prices ranging from a few bits of silk to a hundred pieces of damask, depending on the number of blossoms. He mentioned dark red ones that were priced at the equivalent of the taxes on ten modest houses and brought a deep sigh from an old farm laborer who was passing by. The peony has always been a great favorite among Chinese gardeners, who have developed many varieties that represent a vast improvement over the wild kinds. More especially the tree peony has been held in high esteem. As to color, a deep red variety called "Ink" had its day of favor. More recently special value has been placed on white ones. The peony is not only the emblem of spring, but it is also the symbol of prosperity and wealth. In China, as the tiger is the "king of the beasts," so the peony is the "king of the flowers." Of much significance is an ivory snuff bottle

The day-lily is easily identified on this bottle of Imperial painted glass. 19th century. Courtesy, Minneapolis Institute of Arts.

The outer layer of opaque white glass was partially carved away leaving an orchid design projected against a background of transparent ruby red through which the snuff spoon can be seen. From collection of Dorothy Huggins.

Begonia leaves and blossoms cover the entire surface of this bottle. Courtesy, Metropolitan Museum of Art.

A venerable philosopher and his attendant are shown beneath an ancient pine tree. The reverse of this ivory bottle is decorated with a bamboo tree. 17th-19th century. Courtesy, Minneapolis Institute of Arts.

Interesting interpretation of a willow tree decorates this ivory bottle. 17th-19th century. Courtesy, Minneapolis Institute of Arts.

carved into the form of a round-faced, opulent-looking boy who carries a peony in one hand and a peach in the other. Here is depicted both riches and long life.

The lotus, emblem of summer, is an exceedingly well-liked motif in all types of Chinese art, but nowhere is its charm better demonstrated than within the small compass of snuff bottles. It may be a lotus leaf that is part of a carved ivory bottle; or the whole underside of a lotus flower may form the reverse of another; or naturalistic blossoms and leaves may be the decoration on one of porcelain; or it may be the conventionalized form known as the "sacred" lotus; or it may be that miracle of artistic skill—a lotus design painted on the interior of a beautiful blue Peking-glass bottle of marvelous transparency. To anyone who ever had the good fortune to call Peking home, a lotus-decorated snuff bottle brings memories of cool morning rides past the lotus-filled moat around the Forbidden City and the incomparable views of the lotus fields in the Imperial parks. It seems quite fitting that the lotus is also a symbol of purity, rising as it does from the muddy bottom of pool or lake and appearing in spotless, stainless beauty above the surrounding leaves. To Buddhists, its symbolism is especially meaningful.

Emblematic of autumn, the chrysanthemum has been associated with wine and poetry. Perhaps because of this association it is likewise symbolic of joviality. In modern times chrysanthemums were among the favorite flowers of the Empress Dowager Tzu Hsi who had them in the courtyards of her Summer Palace. There, no doubt, she could enjoy more freedom than she had in her palaces in Peking. However, love for the chrysanthemum and an appreciation of its beauty is not only modern but also traditional, reaching far back as it does through the centuries. The chrysanthemum has been represented by poets and painters as part of a quiet life, a life isolated from the cares of public activities. The name T'ao Ch'ien (A.D. 365-427) is practically a synonym for chrysanthemums. He was the poet who served as a magistrate for a time, but gladly retired to raise chrysanthemums and enjoy a life close to Nature. Upon his return to his home after his official tour of duty, he expressed his joy in a famous poem that mentions that the paths in his garden were overgrown but his pine and his chrysanthemums remained as they had been before he left them. The Chinese have a saying, "The pine and the chrysanthemum endure." Like the pine, the chrysanthemum withstands frost and survives after all the other flowers have faded. Thus, it becomes a symbol of long life. In a collection of the Pacific coast, chrysanthemums are the decoration for snuff bottles of white opaque glass, turquoise, imitation coral, porcelain, and jade.

In China the flowering plum stands first among the flowers. Its popularity with both poets and painters has been unequalled. Stories are told of painters who were not content to make daylight paintings of it, but mastered the art of painting its appearance as the moonlight shadowed its silhouetted branches against the paper windows at night. Like the cherry of Japan, it is planted in Chinese gardens for the beauty of its flowers rather than for its fruit. Even gnarled and lifeless-looking old trees send out twigs that break into bloom. Because of this characteristic, it is one of the many symbols of long life. Its cold whiteness is snowlike in its purity, making it the truly fitting emblem of winter. Combined with the peony as the decoration for a snuff bottle, we see symbolized both riches and long life; with magpies, long life and good luck are portrayed.

The plum is not only a member of the "flowers of the four seasons" but it is also one of the group commonly known as the "three friends of winter." These are the plum, the pine, and the bamboo—the pine and the bamboo remaining green throughout the winter; the plum bursting into flower before winter has really gone. They have the qualities of friends who go through adversity together. All three are symbolic of long life. Perhaps no plant in China is of greater utilitarian importance than the bamboo. It has been put to countless everyday uses, and in addition it has inspired poets and

painters throughout long centuries. The pine is associated with old age. One writer expressed the thought that a garden with flowers but without an old pine tree is like a group of women and children without a venerable man in their midst to whom they may look up.

Another tree which is always found in Chinese gardens is the weeping willow, *Salix babylonica*. In paintings and in poetry it is associated with swallows, orioles, and cicadas. Chinese ladies with sylphlike figures are said to have "willow waists." The beauty and grace of the willow provided inspiration for Chinese dancing-girls, who, with their flowing robes and pendent sleeves tried to imitate swaying, breeze-blown willow branches. Buddhists believe that water sprinkled from a willow branch has a purifying effect. The Chinese willow has doubtless become best known to the Western world through its part in the famous willow pattern of chinaware.

The banana, *Musa sapientum*, is commonly grown for its ornamental appearance in Chinese gardens that are sufficiently tropical; it is also found in our snuff-bottle garden. There is an old legend of a student who, lacking proper writing materials, wrote on banana leaves. Consequently the plant has become the symbol of self-education. The Chinese are sensitive to sounds, which they consider part of the charm of their gardens—the wind in the pines, the cicadas in the willows, and the rain on banana leaves. Banana plants may be seen in paintings of the Sung dynasty (A.D. 960-1279) and in the garden scenes on lacquer chests of a century and a half ago.

China can boast several fine kinds of magnolias, in color from jadelike white to rich maroon. The flower is symbolic of feminine sweetness and beauty. In paintings of Chinese beauties magnolia trees are often introduced in the backgrounds. A perfect example of this combination is found in an ivory snuff bottle in the Minneapolis Institute of Arts. On one side of the bottle are two ladies in a garden, the garden design being carried around to the reverse side where we see a beautiful magnolia tree with a pheasant in its branches. A design of this type was also used on porcelains. One variety of magnolia is called the "Smiling Flower"—a name with a poetic quality that may often be noted in Chinese nomenclature.

The boy's cap forms the stopper of this ivory snuff bottle, which is decorated with the peach for long life and the peony for riches. 17th-19th century. Courtesy, Minneapolis Institute of Arts.

The *Hemerocallis*, the so-called day lily, which in recent years has been developed so greatly by our hybridizers, apparently did not catch the imagination of Chinese gardeners as did peonies and chrysanthemums. Of these emblems of spring and autumn, dozens of varieties exist as compared with the few kinds of Chinese day lilies. *Hemerocallis graminea*, an orange-colored form, has had a long-standing reputation as a charm for driving away grief. The long buds of this variety as well as those of a lemon-yellow kind, *Hemerocallis fulva*, have been used both as a medicine and as an ingredient in certain kinds of food. Inasmuch as the *Hemerocallis* is the emblem of motherhood, women tuck the buds into their girdles in the hope of the birth of sons. These lilies are found in paintings and have also been noted on flower-decorated porcelains of the Ch'ien-lung period. Our snuff-bottle garden has a beautiful specimen under a leafy tree upon which two birds perch.

The begonia is a flower that we may not usually associate with the flora of China, but one need only experience the surprise of finding wild ones on a Chinese hillside to realize that this flower had its share in making China the "Flowery Kingdom." It is recognized among the flowers that decorated porcelains of the Ch'ien-lung period and it is frequently met as a motif in embroideries. Although it seems to have no symbolic significance, it is included here because of the begonia design on a snuff bottle in the Metropolitan Museum.

This bottle of carved ivory was overlaid with red lacquer bringing into relief the garden scene with its banana, tree peony and Chinese ladies. 17th-19th century. Courtesy Minneapolis Institute of Arts.

Of much greater importance is the orchid, called *lan hua* in the Chinese. The flowers of this form are delicate rather than showy,

Above, ivory bottle upon which black lacquer was used as a contrasting background for the magnolia tree. 17th-19th century. Courtesy, Minneapolis Institute of Arts. Below, the stem of the melon serves as the stopper of this bottle, which was carved from turquoise. Courtesy, Minneapolis Institute of Arts.

but their fragrance puts them in a class by themselves. They are symbolic of feminine charm and refinement. In paintings the orchid is often shown with bamboo, each demanding supreme skill on the part of the painter. On a painting of the Ch'ien-lung period appears this poetic colophon, descriptive of the orchid, bamboo, and rock that make up the composition: "The orchid is pure and lonely in nature; when sold to human beings, its freedom is lost; luckily it has the bamboo and rock to keep it company, and its spring pensiveness is thus avoided." There have been Chinese painters who have spent their entire lives specializing on their portrayal of the orchid. Not only has the orchid been popular in paintings, but it has also served as an oft-recurring motif in embroideries. It is likewise one of the "hundred flowers" on porcelains, as well as being a decoration on pieces of Chinese pewter. A snuff bottle of special appeal was fashioned of two layers of glass so that when the outer layer of opaque white glass was partially carved away, there remained an orchid design projected upon a background of transparent ruby red.

An old scholar in a secluded spot in a bamboo grove makes an appropriate decoration for this bottle, which was carved from a piece of bamboo. Note the pine tree at the extreme right. 17th-19th century. Courtesy, Minneapolis Institute of Arts.

The Chinese word *kua* is used for all sorts of melons, pumpkins, gourds, cucumbers, and their cousins. The melon features in two well-known Chinese sayings. The equivalent of "Abstain from all appearance of evil" is aptly expressed by: "Don't tie your shoes in a melon patch, neither adjust your hat under a plum tree." "Plant melons and get melons, sow beans and get beans" carries the full import of "Whatsoever a man soweth, that also shall he reap." In Chinese art the bottle gourd, *Lagenaria vulgaris*, called *hu-lu* by the Chinese, is extremely common. Numerous vases and snuff bottles have been made to represent double gourds, and sometimes the gourd has triple bulges. The *hu-lu* is a symbol of magic and long life. In representations of the God of Longevity, a small bottle gourd is usually tied to the end of his staff.

The grape, *Vitis vinifera*, was probably introduced into China from the West during the second century B.C., and by the T'ang dynasty (A.D. 618-906) it had become one of the favorite motifs on the backs of bronze mirrors in the design known to the Chinese as the "sea horse and grape." In later times the grape vine and squirrel became a popular pattern. In North China it is customary to coil up the vines and cover them with earth to protect them during the cold winters. Although the grape is common both in markets and in art, it seems to have no emblematic significance.

This, however, cannot be said of three other Chinese fruits—the peach, the pomegranate, and the Buddha's-hand, which (Continued on page 386)

A Bat Can Be A Pet

By BLANCHE PENROD YOUNG

Illinois Natural History Survey

At an age when some youngsters may have acquired fears of bats and reptiles, eleven-year-old April Ann Smith had successfully kept a bat in captivity as a pet. The bat was sleek and healthy, had a good appetite and a friendly disposition.

April Ann has had so many unusual pets that they are taken as a matter of course in the Smith household. She began with pet lizards, which are still her favorites.

April's father, Dr. Philip W. Smith, is a vertebrate zoologist with the Illinois Natural History Survey at Urbana, and her mother is currently working in the Museum of Natural History at the University of Illinois. It was her mother who started April on the "bat project" last August, when she answered a call for help in catching a confused bat found flying about in one of the University buildings. She succeeded in capturing it. Knowing that bats seldom survive more than a few weeks in captivity, Mrs. Smith, nevertheless, took the tiny animal home.

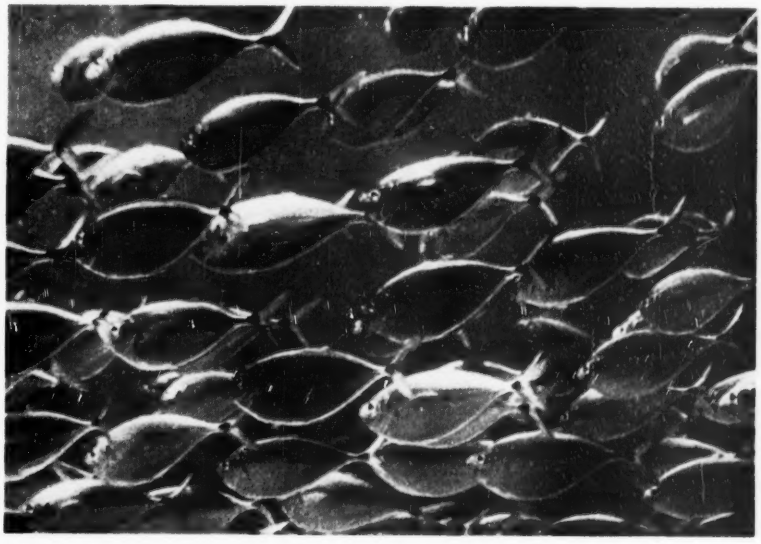
It was a male big brown bat, *Eptesicus fuscus fuscus*, and was promptly named Ferdie. During the late summer Ferdie became quite tame and developed a prodigious appetite for mealworms and raw hamburger, which he eats from April's hand. He also readily sampled ice cream, cheese, milk, cottage cheese, eggs, and cod liver oil. With the coming of cold weather his interest in food lessened somewhat, and he refused to fly about the house as he formerly did.

Meanwhile, further research on bats continued in the Smith home. In order to give Ferdie some companionship, the Smiths have captured other bats from time to time and put them in his cage. Several lived for a few weeks. A female big brown bat, called Ferdina, however, proved unable to thrive or become any more tame after a little more than two months of captivity. A Keen's bat became even tamer and more friendly than Ferdie in the twelve weeks it was in his cage. Different species have offered interesting comparisons in habits and personality traits. None of the other bats, however, seemed to like captivity as well as Ferdie, who was still "going strong" in early June, when, after a little more than nine months, he was given his freedom.

Bumpers

By HUGO H. SCHRODER

Photograph by the Author



Bumpers belong to the jack family. They are rather small, usually being less than ten inches in length, their scientific name seeming almost as long than they are. It is *Chloroscombus chrysurus*. Bumpers are found in the southern United States and in the West Indies. Many of their relatives are fine food fishes, but the bumper is not considered even fair eating, as it is too thin and bony. They travel in schools, as can be seen in this photograph taken in the Marine Studios, Marineland, Florida, where the fishes amuse visitors.

Killdeers on the Roof

By LLOYD P. PARRATT

NORMALLY the killdeer deposits its eggs on the bare ground in fields, usually near water. But one family chose to nest in the pebble granite on the roof of Chaffey's Boy's Gymnasium in Ontario, California.

The discovery of the four eggs on March 30 started a twenty-four-day vigil of observation. This involved my climbing over ledges to three different levels of roof with assistance from Ken Proctor, a fellow summer Ranger at Glacier National Park.

There was some speculation among friends who watched our activities from the ground, that the eggs had been fried by the hot sun. But I remained optimistic and the morning of April 16, I received this urgent note from Ken: "When I climbed up this morning the male killdeer fluttered away from the roof on my approach. Reaching the top I looked over and saw the female was on the nest and another killdeer was standing nearby. About fifteen feet away was a good-sized ring-necked dove watching the nesting killdeer. They saw me as I came over the ledge and the female made quite a fuss with her "killdee" call. I checked the nest and found no apparent change, but could not help but wonder what was going on with so many birds around." Later we found all well with birds and eggs.

Then, on April 22, a phone call from Ken brought the news that the eggs were hatching. By late afternoon all four were hatched, but it was so cloudy we decided to wait until morning to take pictures. The young birds disappeared during the night. There was some speculation that the adults may have carried the young to the ground, perhaps as the woodcock sometimes carries its young clasped between its legs. Young killdeers were observed at the Chaffey Farm nearby shortly after the young disappeared from the roof.

Early in June a family of killdeers was reported on the roof of South Hall. We found them on June 5. At our approach the adults gave warning cries, and the young crouched down in corners where their natural camouflage made them difficult to find. The adults complained vociferously all the time. The young would freeze at a certain call note, and would not move until a call note of a different pitch would cause them to get up and run toward the adult birds.

The adults would calm down after we left the roof and observed them from a window, but they continued to call softly. Frequently there was quite a convention of interested birds. Ring-necked doves, Brewer's blackbirds, and house sparrows seemed to hang around.

The roof-nesting killdeer on the roof, its nest of four eggs blending with the decomposed granite structure.

The female blackbirds seemed definitely attracted by the calls of the young birds but kept a safe distance due to the adult killdeers. The male killdeer stood guard and drove the other birds away when they got too close. He ran along the raised-edge of the roof, scolding all intruders.

The next morning I discovered the killdeer adults calling loudly and flying back and forth across the roof. Three mockingbirds were also seen along the edge of the roof. After considerable searching I found only two nestlings, and the other two turned up in the corner drain. I suspected the mockingbirds, and the adult killdeers were greatly alarmed by the mockers, marauders of great persistence.

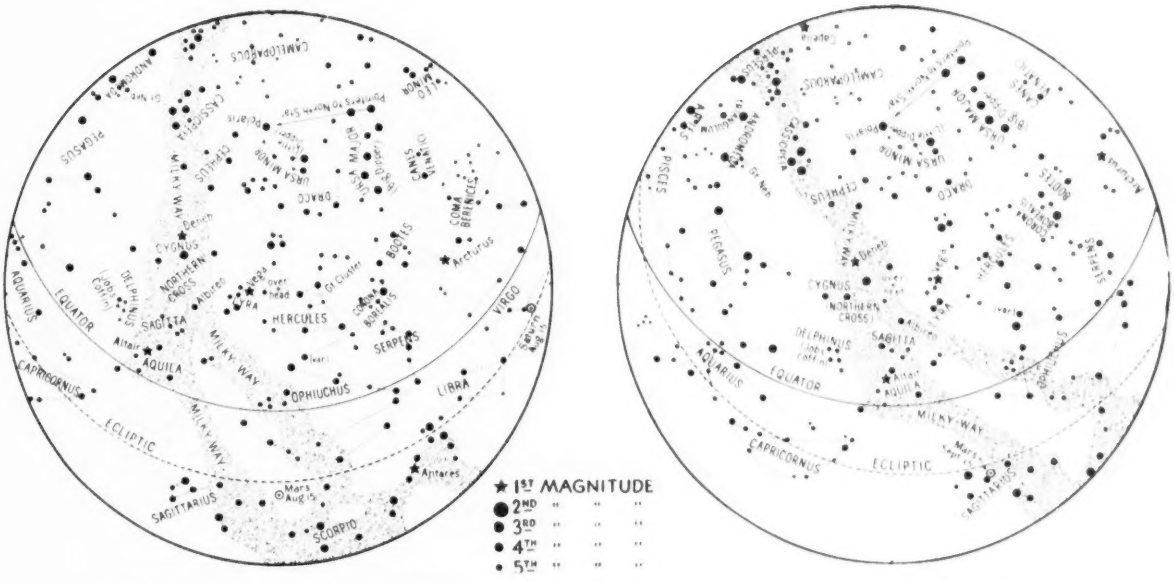
On the third day the two adults were calling, and I found the young birds lying dead along the raised sides of the roof. They showed no marks of violence, and may have died from dehydration or lack of food on the hot roof, decomposed granite forming a veritable desert.

Kenneth E. Stager, Curator of Ornithology at the Los Angeles County Museum, told me that killdeers had nested on the gravel roof of their museum for many years. He said that the young usually perished, but that they had been able to transfer a number of broods to the ground, where the parents took over their care.

Transitivity

By GEORGE W. JEFFERS

I love to sprawl out on a beach—
Beyond the ocean's probing reach—
And with the fingers of each hand,
Trace pictures in the willing sand
Then later, when the tide comes in,
See all my deeds washed out, like sin.



9 P.M., Aug. 1; 8 P.M., Aug. 15

9 P.M., Sept. 1; 8 P.M., Sept. 15;
7 P.M., Sept. 30

To use these maps hold them before you in a vertical position and turn until the direction of the compass that you wish to face is at the bottom. Then, below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south. Times given are Eastern Standard.

August and September Skies

By ISABEL M. LEWIS

THE USUAL yearly display of the Perseids, the meteor shower that appears in greatest strength in the early morning hours of August 12, will be seen at a disadvantage this year since full moon will occur on August 14. Bright moonlight will blot out the light of all but the brightest meteors as they streak across the heavens.

The Perseids are more widely distributed along their orbit than most of the other periodic swarms of meteors, which generally follow in the orbit of some known comet. The Perseids travel in an orbit that is identical with that of the bright comet of 1862, known as Tuttle's Comet. They are met in considerable numbers every year for some distance from the point of intersection of their orbit with that of the earth, appearing any time over a period of more than three weeks from late in July until after the middle of August. As the name implies, their radiant, or the point from which, as a matter of perspective, they appear to come, lies in the direction of the constellation of Perseus, which at this time of year rises in the northeast around midnight. It is for that reason that they are met by the earth in greatest numbers "head on" in the early morning hours, and are swiftly moving streaks, bluish-white in color, as they dart across the sky, heated to incandescence in their brief encounter with our atmosphere. Merely grit-like particles, even the largest and brightest of the Perseids are entirely consumed and the products of the combustion settle to the earth in the form of meteoric ashes.

August is a month in which we have not only the scheduled appearance of the Perseids in the northern hemisphere but also more than the usual number of stray or sporadic meteors. These may be observed coming from almost any direction at any time, but differing in color, velocity, and brightness from members of this well-known swarm. Possibly because this is one of the most favored vacation times of the year, many of us see more meteors darting across the heavens at night. Also we have more time to become acquainted with some of the most brilliant of the summer constellations and their brightest stars, some of which, such as Vega in Lyra, Deneb at the top of the Northern Cross in Cygnus, Altair in Aquila, and Arcturus in Bootes, remain visible in the evening skies well into the fall months.

Those who keep Daylight Saving Time in August and September must bear in mind that the times for which the maps are given have not been changed and are for the same local time as always. Expect *at ten o'clock* in the evening, therefore, in Daylight Saving Time, to see the heavens as they appear on the chart at the

nine P.M. there indicated.

Scorpio and Sagittarius are the two most brilliant constellations of the zodiac south of the celestial equator, and they are in fine position for observation early in August, when they will both be found well above the southern horizon and not far from the meridian at nine P.M., local standard time. Both constellation are in the path of the Milky Way, which is now conspicuously visible on clear, dark nights in the eastern part of the sky, passing from Cassiopeia in the northeast into Cygnus. There the Milky Way divides into two branches, the eastern one passing through Sagitta and Aquila into Sagittarius, and the one to the west through Serpens and Ophiuchus to Scorpio. In Sagittarius, in which direction lies the center of our galaxy, the star clouds of the Milky Way are exceptionally brilliant. Scorpio is the more brilliant of the two constellations, and, in addition to the first magnitude star, Antares, contains more stars of second and third magnitude combined than any other constellation now visible. Due to its far southern position in mid-latitudes of the northern hemisphere, Scorpio will disappear below the southwestern horizon before midnight in August. Sagittarius is attracting more attention than usual this year since Mars, from spring on through all the period of its greatest brilliancy at this favorable opposition, has remained in this constellation and will continue to be found there well into the fall.

Early in August Mars will be found a little to the west of the configuration formed by four bright stars in Sagittarius. These lie to the west and southwest of the grouping of five conspicuous stars that outline the small milk dipper, as it is called, inverted toward the southern horizon. From early August on through September it will be interesting to follow the motion of Mars eastward with respect to these two bright configurations of stars in Sagittarius. During this time the constellation will pass from the southern to the southwestern sky in the evening hours. Mars will remain throughout these two months the outstanding object in splendor, after Venus has passed below the southwestern horizon about two hours after sunset. Venus, of course, always surpasses all stars and planets in brightness, even when they are at their greatest brilliancy. Its dazzlingly white color is a strong contrast to the ruddy glow of Mars, when both are above the horizon now in the early evening. On August 1 Mars will be almost exactly equal in brilliancy to Sirius, brightest of the stars, but it is now decreasing rather rapidly in brightness as it increases its distance from the earth. On the first of August its distance from us is about 45 million miles. On September 1, although it has become noticeably less brilliant, it is still a little brighter than Canopus, the second brightest star in the heavens, and on October 1, although then half a magnitude fainter than Canopus, it still outshines all other stars except Sirius and Canopus. Mars' distance from the earth has now increased to about 73 million miles, and the time for intensive observation of the planet at the past favorable opposition is over until the still more favorable opposition that will take place in September, 1956.

The Lost Star

By THOMAS MORRILL

I looked and saw a falling star
Over the hill beyond the tree,
I searched the grass with greatest care
But couldn't find it anywhere.
I found a sparrow nesting there
Would she be hiding it from me
Over the hill beyond the tree?

In August Venus will be visible for about two hours after sunset, passing Spica, in Virgo, the end of the month. On September 6 it will be at its greatest eastern elongation, but as it is then low in the southwest it will not be favorably placed for observation at that time. On September 15 it will pass from Virgo into Libra and will also be in conjunction with Saturn and about six degrees south of it at that time.

Saturn, during this period, does not vary appreciably in brightness. It is almost exactly equal to Altair, in Aquila, in brightness and a pale yellow in color. It remains in the southwest, setting about three hours after the sun the middle of August, and about two hours after it in September. It will remain in Libra throughout both months.

Mercury will be too near the sun in both months to be observed. It will pass from west to east of the sun and from the morning to the evening sky at time of superior conjunction with it on August 21. From that time on it will be in the evening sky, but too close to the sun to be observed in the evening twilight in its unfavorable position at this time of year.

Jupiter is a morning star in Gemini in August and rises about two hours before the sun. Late in September it nears the boundary between the constellations of Gemini and Cancer and is high in the eastern sky at sunrise, rising not long after midnight. All summer Jupiter has been slightly less brilliant than Sirius, which it usually surpasses in brightness. It can be identified always by its remarkably steady, golden-yellow radiance and its exceptional brightness, generally surpassed only by Venus in splendor.

The sun will be at the autumnal equinox this year on September 23 at 8:56 A.M., E.S.T., when it will cross the equator from the northern into the southern hemisphere and autumn will begin in the northern hemisphere and spring in the southern hemisphere. When the sun is on the equator, neglecting the effect of refraction, day and night are equal in length all over the world.

In the northern hemisphere in the month of September, the full moon that occurs closest to the time of the autumnal equinox, which this year will be on September 12, is called the Harvest Moon, and the following full moon in October is known as the Hunter's Moon. In our northern latitudes it is then as the sun is setting and the full moon is (Continued on page 388)

The School Page

By E. LAURENCE PALMER

Professor Emeritus of Nature and Science Education, Cornell University, and Director of Nature Education, The American Nature Association

WITH OR WITHOUT WIRE FENCING

FEW schools will be in session when this appears in print. Instead, youngsters will be off at camp, on vacation trips with their parents, off to the zoo, or playing with the neighborhood dogs and cats. I do not believe that it is easy to keep kids away from dumb animals when there is any possibility for them to get together.

Children probably will need guidance in adjusting to animal association, and in making this adjustment, and we hope that to some extent the insert in this issue of *Nature Magazine* may be of some help in this connection. Clifford Moore's *The Book of Wild Pets*, newly republished by Charles T. Branford Co., Boston, is almost a must to a leader in this field of education. Also on the shelves for study should be William Hillcourt's *Fieldbook of Nature Activities*, published by Putnam, New York; Vinson Brown's *The Amateur Naturalist's Handbook*, published by Little, Brown and Company, Boston; the Boy Scout Merit Badge pamphlets on *Nature Study* and on *Conservation*, and, I hope, the writer's *Fieldbook of Natural History*, published by McGraw-Hill, New York. A library of such books should give the leader some knowledge of the kinds of wildlife, their needs so far as food and shelter are concerned, and of how they may be kept in captivity, if for any reason this seems necessary.

Rather than encourage youngsters to try to keep in confinement every animal they can capture, I would much prefer that they center their efforts on supporting the program of the Boy Scouts so to improve environment that wildlife will be able to take care of itself, and, free, get along with human beings on a mutually satisfactory basis. If it becomes necessary that the animals being studied be kept in cages in buildings, then I am sure our leaders will want to glance through the pages of Edmond Farris's book *The Care and Breeding of Laboratory Animals*, published by Wiley, New York.

For suggestions on improving environment for the benefit of wildlife I would refer you to Gabrielson's *Wildlife Management*, published by Macmillan; Grange's *The Way to Game Abundance*, published by Scribners; Wing's *Practice of Wildlife Conservation*, published by Wiley, and Trippenssee's two volumes on *Wildlife Management*, published by McGraw-Hill. For suggestions for adapting the teachings of these books to the juvenile viewpoint be sure to get from your local Boy Scout headquarters their 1954 program on environment improvement. I am sure they would not have the slightest objection to having you assist them in what they are trying to do.

There is probably no month in the year in which more youngsters will be brought face to face with wildlife than in August, the high tide of the camping season. What used to distress me about many camping programs was the conviction of some of the leaders that they were making the most of their opportunities if they let the youngsters engage in some camp craft consisting of making gifts for the home folks, using white birch bark stripped from some handy tree, whether or not this disfigured the trees for life.

What the camp director might well do would be to recognize the kinds of foods that attract interesting local wild species. He should see that this food is available in reasonable abundance at a point where the campers can see it without disturbing the feeders. Then determine by observation, by reading, or otherwise, at what time of the day, and under what weather conditions, the animals take their food. Once these things are determined, it should not be difficult to bring wildlife and kids together in a way that at least would thrill the children, and certainly would not harm the wildlife. It will surprise many organized campers what can be done with this activity, although it may disappoint some of the manufacturers of camping supplies who provide craft materials that cannot compete with a living woodchuck, beaver, squirrel or deer in interesting youngsters. If parents will insist on wildlife education for their children when they talk with the camp directors, it may help more than anything else, and a few youngsters successfully indoctrinated in this philosophy, before they go to camp, may not only get the maximum from the camp experience themselves, but may add to their own popularity by improving the situation in their camps.

As I have noted repeatedly in these columns, this year, the Scouts are committed to a program in habitat improvement. We wish that every organized camp had a similar objective. We do not expect every camp to participate, but if we can get a few to do it this summer, maybe we can do better next year. I am already working on a special insert designed to be of help along these lines for use next year.

One of the first things to get established is the idea that it is not necessary to keep wire between kids and wildlife. Of course, a raccoon in a wire cage is there when you want to show the camp off, but a coon feeding at dusk or at dawn, even from a garbage can, is much more interesting and thrilling.

If you want wildlife to get acquainted with you, you must make conditions attractive to it. August is usually too late in the season to expect too much from the birds. Most of them are molting in that month, and are inclined to be retiring. But in this month young woodchucks, deer, or raccoons are just beginning to find out something about this big wide world into which they have recently entered. Many of them are no longer receiving parental protection, and in such cases it may be the best time to establish cordial relationships.

If a feeding station can be established at a point where it may be studied with field glasses without disturbing the desired visitors, this may be a good starting point. Then, once the habit of such visits is established, it may be possible for some of the campers to be near the feeding site before feeding time. Blinds may be set up in advance for this purpose, and may provide the kind of experiences that will make the youngsters want to write letters home. These blinds need not cost anything and yet may provide more valuable results than an expensive canoe. Just for the fun of it, when you visit camps this summer, find out how many of them have established blinds where campers can see wildlife in action on the loose. Please let me know what you find out.

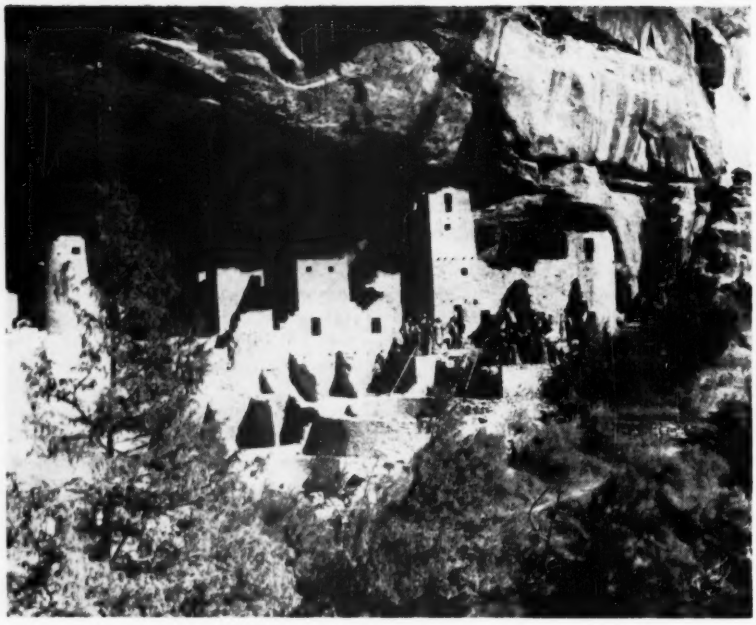
Excellent pictures may be taken from suitable blinds. From some, recordings of sounds may be made with the newer portable sound recorders, which cost less than some boats and should provide more good publicity for life in camp than the whole fleet that the camp supports. Imagine, you camp directors, what it would mean to be able to play to a prospective camper next winter the sounds of loons or an owl on your lake, or, if you are in the mountains of the West, the call of elk that you can hear any night in late August, let us say in the Yellowstone area. There are surely some camp sounds worth recording. Certainly you can record some of them. One of the ways to get these recordings is to make conditions attractive for wildlife, and to provide blinds where you can get as close as possible to creatures.

I know that various organizations provide rating scales to determine the quality of camping being provided. These scales usually consider tents, cabins, boats, tennis courts, bunks, axes, riding horses, baseball diamonds, and so on. Frankly, I would automatically disqualify any camp that did not have and boast about its wildlife feeding stations, the number of wild visitors noted at these stations, the number of observation blinds established for bringing campers and wildlife together, and equipment for photographing and sound recording at these stations.

Let us try these next two months to learn how to get along with wildlife, and with local domestic life, with a minimum of bars to complete freedom. It might surprise you how high are the ethics of some of the best Nature photographers who insist that their subjects be free and wild. Some even frown at using food to bring their subjects to a desired point, but, for the present at least, I will be satisfied this summer of 1954 if a few of you get on speaking terms, or even on squeaking terms, with the wildlife that must abound in your camp.

Camera Trails

By
EDNA HOFFMAN EVANS



A group of visitors going backward into history as they visit the Cliff Palace at Mesa Verde National Park. Photographers will find many friendly helps at this National Park.

THE subject under consideration this time is again our national parks, and particularly the photographic opportunities offered by them. It is a subject I began in the preceding "Camera Trails," but somehow got off the main track and into the less specific field of vacation photography in general.

Now we are back on the national park trail—along with some forty-six million of our fellows—and here we go.

All told, there are some twenty-eight areas designated as national parks included in the National Park System, plus eighty-six areas called national monuments. Besides these, there are sixty preserved places, mostly small in extent, which fall into various categories depending on the historical reasons for which they were set aside. Then, too, there are a few places, not federally owned, in which the National Park Service assists the owner with administrative and professional services.

I wonder whether anyone, even someone officially connected with the National Park Service, has ever visited all of these areas? I have often thought it would be great fun to do so. It would take several years, of course, but given enough time, money, and equipment, I certainly would like to try.

My own record at present is eleven of the national parks, twenty-some of the national monuments, and a fair number of the national military parks and battlefields. Of the latter, those of the Civil War period are my specialties. Each year I manage to add one or more park or monument to my total, so that my collection of interesting sights, beautiful scenes, pleasant memories—and photographs—continues to grow. I wonder how many other people share my national park collecting hobby.

Thus far I have missed some of the best known and most spectacular of the parks—Yellowstone, for example, and Yosemite. On the other hand, I have visited some of the lesser known and more out of the way ones. Everglades National Park in Florida, for example, is an old friend. I knew something of its sloughs, hammocks, and bewildering tracklessness, as well as its fascinating bird, animal, and plant life, even before it joined the national park family.

I have visited Fort Jefferson on its remote key off the southernmost tip of the United States, and I have done some exploring at Organ Pipe National Monument in the fantastically rugged region where the State of Arizona, U. S. A., meets the State of Sonora, Republic of Mexico. This area is supposed to be so forbidding that the road maps warn prospective visitors to make sure they have adequate supplies of water and other necessities before attempting this trip. This warning, I might add, seems a little overdrawn since a good paved road takes the visitor to the 328,162-acre monument and water is available at the ranger station. Of course the side trips and trails offer more rugged obstacles, but who in his right mind would venture into that region without the proper equipment?

As for photographic possibilities, Everglades offers no spectacular formations. Instead, its charm is in the vast expanse of sawgrass marsh, broken by little humped-up hammocks; gnarled, moss-hung cypress trees, and delicate native orchids. It is also a paradise for the bird photographer with proper equipment. Early spring is best, or fall (if the summer has not been too rainy). Winter is chill and in summer the mosquitoes are ravenous. Fort Jefferson is a study in brick work, seascapes, sky, cloud formations and nesting sea birds. Organ Pipe offers weird, distorted shapes of mountain, cliff, and desert, as well as of the plant and animal forms living in them. Spring is the best time, I think, for a visit here. Then the blooming desert shows itself in all its finery, before summer turns it into an outdoor oven, or winter winds chill the visitor to the marrow of his bones.

It has been my experience that sometimes the remoter areas, less known and not so often visited by the vacationing public, offer more fascinating picture possibilities than the better known, more popular ones. I say that honestly, remembering at the same time the quantities of film, both black-and-white and color, that I have shot at the Grand Canyon, Bryce, Zion, and back east at St. Augustine and in the Great Smokies.

To my way of thinking, Hot Springs National Park in Arkansas offers the least in the way of picture possibilities of any area I have visited. Perhaps I did not see the right things but, except for buildings and city streets—not to mention Aunt Agatha standing beside the faintly steaming cauldron that represents the only visible hot spring—the area is a dead loss, photographically. Yet thousands of people flock to it every year.

On the other hand, one of the richest of my photographic finds was the Arches National Monument, tucked away in the southeast corner of Utah. The area has no souvenir shops, soft drink stands, or lodges. For that matter, the ranger station is some miles from the actual park area. The road in is unpaved, and at the time I took it was just recovering from several minor washouts. But the colors, glowing reds and golds against an endless blue sky, and the weird and wonderful rock formations—from the massive Parade of the Elephants to the breathtaking beauty of the Double Arch and the fragile stone lacework of the Delicate Arch—they were enough to send any camera fan into ecstacies.

The Park Service realizes the important role photography can play in enhancing the visitor's enjoyment of these wonderful regions in our country. To emphasize this I want to quote from a letter I received from Ronald F. Lee, Chief of Interpretation for the Park Service.

"Photography is considered one of the most constructive activities the visitor

The Checkerboard Mesa at the edge of Zion National Park is an often photographed formation. Its lined yellow rock makes an interesting contrast with sky and green foliage.

to parks and monuments may enjoy," he wrote. "It fits in with the protection of all wildlife, and adds immeasurably to the enjoyment of the visitor both while on vacation and afterward while reviewing the results. One of the best slogans coined by the Service reads: 'Take only pictures; leave only tracks!'

"Restrictions on the taking of still and motion pictures in areas administered by the service are kept to a minimum consistent with providing protection for often-irreplaceable objects, such as the fragile formations in caves and priceless historical objects. The special photographic trip at Carlsbad is a convenience to the visitor and at the same time provides better control over a few thoughtless photographers whose enthusiasm sometimes carries them beyond reason.

"Photographic Nature walks have been programmed in a number of the parks, but limited personnel has not permitted too much time for this worthwhile activity. . . .

"I am sure the superintendents of all park areas are eager to cooperate with photographers, whether they have expensive professional equipment or a simple box camera. In Yosemite, for instance, the concessioner photographer at the Wawona Tunnel Tree is urged to cooperate with visitors who wish to take their own pictures of their party at the tree. He often helps them by making exposures with their own cameras. In the same park the concessioner gives out a leaflet of suggestions for the best time to take certain pictures and the length of exposure to be given.

"At Big Bend National Park, Texas, Peter Kock, an extraordinarily skilled photographer, is a concessioner. One of his services is the guidance of photographic parties. On his trips with such parties he is able to take them to locations from which the most striking views may be obtained and to give advice which helps to assure success. His rate on such trips is only fifty cents a person."

Mr. Lee concluded his letter with this paragraph: "Those taking motion pictures for their own amusement are under few restrictions in areas administered by the National Park Service. Professional motion picture photographers who make travelogs or feature pictures are required to obtain a permit from the superintendent. If the motion picture requires extensive props, the producer may be required to post bond to insure proper cleanup afterward."

From my own experience I have noted numerous ways in which the Park Service personnel helps visiting photographers. Most outstanding, I think, are the helps rendered at Mesa Verde. Not only is the visitor informed of the best times of day to photograph the various cliff dwellings, but in the museum he will find data posted giving the proper indoor exposure and, better still, he will find a mighty helpful rolling easel on which he can rest his camera while taking the longer exposures required by indoor photography. He can, in this way, take away with him pictures of the very lifelike dioramas, which depict scenes in the fascinating cliff dwellings back in the days when they were busy centers of life and activity.

Another report on photographic helps to visitors comes from Robert H. Rose, Park Naturalist at Sequoia and Kings Canyon National Parks in California. He wrote: "We inject helpful photo-

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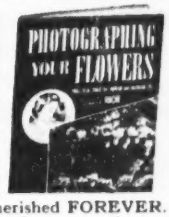
by John P. and Mary Alice ROCHE



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graphing hints for our visitors in our guided walks, evening campfire programs, and museum information service. For example, we are constantly informing visitors an aggregate scores of times daily on the best hours for photographing the General Sherman Tree or the Great Western Divide from the top of Moro Rock. Then there are our hourly trips, in season, through Crystal Cave in which we suggest that those desiring pictures follow along toward the rear of the group. The guide will have groups tarry momentarily at the best places for those with cameras to photograph the group."

And so it is, I am sure, at all the parks and monuments. Truly, I think that every American—be he camera fan or not—should feel an extra surge of pride as he visits the national parks and monuments of his nation. And important, also, he should do his best to help the National Park Service keep them the places of beauty that Nature originally made them.

POINT OF INFORMATION: I cannot conclude this section without some words of thanks to the readers who have written to tell me that there is a way to take a double exposure with an Exakta camera. In the April section on tabletops I mentioned the fact that I thought such a thing was impossible.

In case some other Exakta owners are laboring under the same wrong impression that I was, here is the way to do it. Instead of using the lever to reset the shutter and raise the mirror for an exposure, the knob that indicates the shutter speed should be twisted in the direction of the arrow as far as it will go. This will reset the shutter and raise the mirror without advancing the film, thus making possible a second exposure on the same film.

And so I have learned something else, and I am grateful to my informants. I do not ever expect to know "everything" about photography. But I am sure that if that were possible, photography would lose much of its appeal. The endless possibilities for new subjects and techniques are, to me, the most fascinating aspects of photography.

Pennsylvania Caves

Caves of Pennsylvania. By Ralph W. Stone. Trenton 8, N. J. (1108 W. State St.) 1953. National Speleological Society. 143 pages. Illustrated. $3.00.

Perhaps this should not be reviewed as a book, which, indeed, it is not. Rather it is the December, 1953,, issue of *The American Caver*, which is "published intermittently, at least once a year." This publication is the voice of the National Speleological Society, and when it does appear it always has notable substance of interest to all who go poking around underground in caves. And we should not credit this issue only to Mr. Stone, for such able spelunkers as William E. Davies, William Devitt III, Stuart W. Frost, Donald R. Griffin, Charles E. Mohr, John Dyas Parker, and Henry W. Shoemaker contribute articles related to the central subject of this issue—Pennsylvania's caves. It all adds up to a guide, with maps and a large amount of data, to the caves of the Keystone State. No exact price is given, but one may become an associate member of the National Speleologocal Society for three dollars and get its publications; or a five-dollar regular membership would be better. If you wish to know about Pennsylvania caves you had better join up right away while copies of this publication are still to be had.

Camping Values

Spiritual Values in Camping. By Clarice M. Bowman. New York 1954 Association Press. 240 pages. $3.00.

This book is directed to the camp director and camp counselor, in the main. If the points it makes are taken to heart by such individuals, who preside over the camps' activities, camping can be a far more satisfying experience than, in too many cases, it is today. The author believes that appreciation of Nature in camp is important but that it is only a part of and step toward the realization of other spiritual values that should derived from the camping experience. It would be well, also, if many parents would read this book, and then impress on the camp directors with whom they leave their children for a summer that there is something more than athletic prowess and a good tan to be expected as a camping dividend.

Weather

Our Changing Weather. By Carroll Lane Fenton and Mildred Adams Fenton. New York. 1954. Doubleday and Company. 110 pages. Illustrated by the authors. $2.50.

In their opening chapter the authors of this interesting weather book admit that there is nothing that we can do about the weather. But they do not concede that we should be ignorant about the probabilities of weather change. Anyone, they insist, can do a reasonably good job of forecasting, and can find a great deal of pleasure in trying to be an amateur weather prophet. This is an introductory weather book for young and old, shorn of scientific terminology and simply and interestingly presented.

Bird Guide

The Pocket Guide to Birds. By Allan Cruickshank. New York. 1954. Pocket Books, Inc. 216 pages. Illustrated with 72 color photographs and 78 line drawings. Fifty cents.

This is a republication of the Cruickshank guide published last year by Dodd, Mead and Company and includes all of the text used in the earlier edition., as well as all of the illustrations printed from new plates. The result is the least expensive identification guide yet to appear, so far as we know. It does not take the place of such field guides as those authored by Peterson, Pough and others, but is a splendid introduction to study of and interest in birds.

Sea-Birds

Sea-Birds. By James Fisher and R. M. Lockley. Boston. 1954. Houghton Mifflin Co. 320 pages. Illustrated. $6.00.

The community of sea-birds of the North Atlantic is a varied and fascinating one. It is, too, complex, with an ecology that is one largely of wild frontiers. The two authors of this fascinating and important book are British ornithologists and authorities on North Atlantic seabirds. They have studied the sometimes intricate movements and migrations of these species, which peregrinations constitute a most interesting part of their lives. Mr. Fisher writes easily, as readers of recent articles by him in *Nature Magazine* well know, and anyone interested in birds will find this volume alluring.

Treasure-Diving

Treasure-Diving Holidays. By Jane and Barney Crile. New York. 1954. The Viking Press. 263 pages. Illustrated. $3.95.

This is a report of the underwater adventures of a whole family that seems to have been born with fins and flippers. It is the story of the two authors and their children—Ann, Joan, Susie and George—and their diving for treasure of both natural history and other significance beneath the waters of the Pacific, the Mediterranean and the Caribbean. This is really a book of Nature, for the authors are keen observers of Nature, but often the undersea dives brought to light objects that had been beneath the waters for many years. The text is excellently written and holds the reader to the end.

Good Farming

Farming with Nature. By Joseph A. Cocannouer. Norman, Okla. 1954. University of Oklahoma Press. 147 pages. $2.95.

The publishers describe this book as "A blueprint for soil management designed to enable all farmers and gardeners to grow better-tasting, healthful, high-quality fruits, vegetables and other food crops." The author turns to Nature to achieve this important objective, holding that the soil-world is a chain made up of numerous fertility links, each performing a series of specific tasks as a part of one harmonious whole. He outlines a program that he feels will enable man to assist Nature in building and maintaining a complete soil.

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On Conservation

The First Book of Conservation. By F. C. Smith. New York. 1954. Franklin Watts. Illustrated by Rene Martin. $1.75.

This is one of the series of "First Books" being brought out by this publisher and seeking to supply the younger reader with sound introductory material. The author has done a remarkably fine job of condensing the story of conservation into small compass and telling it in a manner that should be interesting and intelligible to the youngster. Indeed, many adults could read this book with profit. In a concluding chapter the author cites things that the boy or girl can do to aid the cause of conservation.

Insects

Insect Fact and Folklore. By Lucy W. Clausen. New York. 1954. The Macmillan Company. 194 pages. $3.50.

"Usually," Miss Clausen writes of her book," a book dealing with entomology is written from the angle of insects alone. This book deals with insects and people and is the result of fifteen years of research in bringing together insect facts, folklore, superstitions, products and the many uses to which insects have been put throughout the world. . .Its main purpose is to overcome the repugnance that most lay persons have toward insects, to make people aware of the fact that the majority of insects are interesting, necessary, and do play an important part in the everyday life of all peoples." In this interesting, well-written and informative book the author, who is an assistant in the Department of Entomology, American Museum of Natural History, has succeeded admirably in her purposes.

Minnesota Geology

Minnesota's Rocks and Waters. By George M. Schwartz and George A. Thiel. Minneapolis. 1954. University of Minnesota Press. 366 pages. Illustrated. $4.00.

This is a popular story of the geological story of Minnesota, where are to be found some of the oldest rocks that exist on the face of the earth. It is a book for the amateur geologist, the student of science, the visitor to the State and the "rock hound." The Arrowhead country and the outstanding region of the Quetico-Superior place Minnesota in a class by itself as a lure to those seeking the outdoors. The story back of the State's lakes and streams is a fascinating piece of geological history. The first part of the book describes these processes, the second dealing with geological excursions through Minnesota and the features that may be seen. There are excellent illustrations and maps, as well as a reference section that provides a list of all Minnesota minerals and a glossary of geological terms. The authors, both geologists, provide a book that is basic to a real understanding and enjoyment of the State.

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SNUFF-BOTTLE GARDEN

(Continued on page 376)

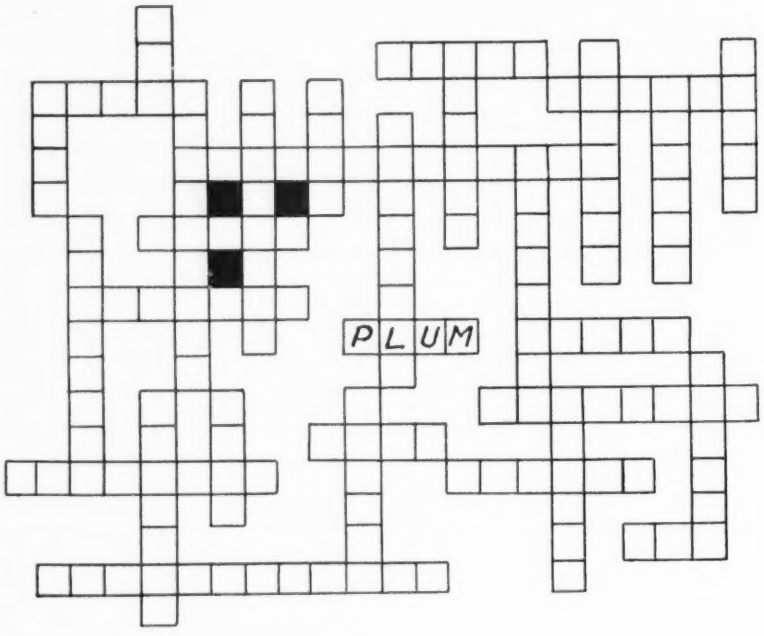
are called the "three abundances." As already mentioned, the peach is one of the long-life symbols—and long life, an abundance of years, is counted as one attribute of a full life. Another essential is an abundance of descendants, which is symbolized by the pomegranate, *Punica granatum*, with its numerous seeds. The third "abundance" is the Buddha's-hand, *Citrus medica sarcodactylus*, a peculiar fruit of fingerlike divisions, which is symbolic of an abundance of official promotions. Artists and craftsmen have made constant use of the three abundances. Gifts bearing this motif carry the felicitous wish, "May you have long life, official promotions, and as many descendants as a pomegranate has seeds." This was the message that was carried in green relief on a cloudy white glass snuff bottle of the Ch'ien-lung period.

It seems strange that primulas, gardenias, hydrangeas, azaleas, rhododendrons, and camellias have not taken places of importance in the ornamentation of snuff bottles, but they seem to have been overlooked although they are among the most showy flowers in certain areas in China.

An arm-chair odyssey, begun within the borders of a snuff-bottle garden, may be extended far beyond its narrow confines. With our increasing knowledge of the symbolism of Chinese plant life, we shall develop a growing appreciation of the Chinese love of Nature—and our own love of Nature may be deepened with this engrafting from an ancient culture.

Scrabble in A Chinese Garden

By MABEL IRENE HUGGINS



IN THE center of our scrabble board we will start with the word PLUM, inasmuch as it was chosen as China's national flower. We can expect to find places for the other "flowers of the four seasons" and for the other two of the "three friends." Just so we will not waste time barking up the wrong tree, we will not try to find places for the "three abundances" because they are not here. However, a smart Chinese gardner should locate a goodly share of the thirty flowers, trees, flowering shrubs and vines that can be fitted into these spaces. See page 388 for the answer.

Central American Birds

Life Histories of Central American Birds. By Alexander F. Skutch. Los Angeles. 1954. Cooper Ornithological Society, University of California, Los Angeles 24. 450 pages. Illustrated by Don Eckelberry. Paper, $9.00; buckram, $10.00.

"Alexander Skutch, gifted naturalist and observer, unlike most others," writes Dr. Alexander Wetmore in an introduction to this important book," has given his undivided attention for many years to painstaking observation and study of living birds, years that have brought him a wealth of detail on the life cycles of many kinds. His information in this field now undoubtedly is greater than that of any other ornithologist, and, happily, this facility for gathering data is coupled with an unusual ability in its presentation through the means of the written word."

Those who have read Dr. Skutch's articles in ornithological journals and in *Nature Magazine* know how extremely careful and complete are his field observations, and how outstanding his ability to write about them. This latest work of his, which treats with the birds of the families Fringillidae, Thraupidae, Icteridae, Parulidae and Coerebidae, is ample further evidence of the wedding of fine ornithology with fine writing, if any such evidence were needed.

In 1928 and 1929 Dr. Skutch was in Central America on a botanical assignment at the former research station of the United Fruit Company near Almirante, western Panama. This site, however, he says, "provided such exceptional advantages for bird study that it would seem impossible for anyone susceptible to the influences of nature as a whole not to have taken a growing interest in the birds around him." With what time he had available, Dr. Skutch made detailed studies of the nest life of the Rieffer hummingbird and the black-crowned Tody flycatcher. Returning to the United States he searched for information about the birds he had seen in Panama, finding that, although Central American birds had been extensively collected and classified, little was known about their habits of life. This gave him the determination to learn what he could about birds of tropical America.

In 1930, while studying the anatomy of the banana plant in Honduras, Dr. Skutch added field data on more birds, and again in 1932 increased his information through a stay on the Guatemala-Honduras boundary. In 1934 he journeyed widely through the Guatemalan highlands on a plant collection trip, with side emphasis on birds, and spent time at Barro Colorado Island in Gatun Lake, Panama. Finally he went to Costa Rica in late 1935, settling in the valley of El General and devoting himself since that time largely to studying the natural history of the country and writing about it.

Recognizing that it would be beyond the possibilities of any one individual to learn about the habits of all of the birds of the region, or any large portion of them, Dr. Skutch dedicated himself to the presentation of fairly complete life histories of a relatively small number of Central American birds. These make up this volume, a fascinating ornithological work that is enjoyable for reading by anyone, even one who may know little about birds. One has the feeling of being with the author while he makes his observations, and cannot fail to catch his enthusiasm for bird study, which he so successfully translates into words.

Briefly Noted

Time Counts. By Harold Watkins. New York. 1954. Philosophical Library. 274 pages. $4.75. The story of the calendar, with emphasis on the movement to establish a world calendar.

Applied Atomic Energy. By K. Fearnside, E. W. Jones and E. N. Shaw. New York. 1954. Philosophical Library. 156 pages. $4.75. A book providing a background of knowledge of nuclear physics necessary to understanding the techniques of applying atomic energy to peaceful purposes.

Sportsman's Digest of Fishing. By Hal Sharp. New York. 1954. Barnes and Noble. 280 pages. Illustrated. $1.00. How-to-do book on bait casting, fly casting, spinning, trolling, ice fishing, fishing for bass, pike, trout and other fresh-water fishes, rods, reels and tackle, and cooking.

The First Book of Rhythms. By Langston Hughes. New York. 1954. Franklin Watts, Inc. 63 pages. Illustrated by Robin King. $1.75. Starting with lines, the author leads into the rhythms of plants and animals, tides, moon, night and day, and the seasons.

Essays in Science. By Albert Einstein. New York. 1954. Philosophical Library. 114 pages. $2.75. Abridged edition of the author's *The World as I See It.*

Landmarks. By William Plumer Fowler. Foreword by Ogden Nash. Boston. 1954. Bruce Humphries, Inc. 70 pages. $2.50. A collection of poems of the New Hampshire seacoast, most of them fine sonnets.

Hunter's Choice. By Alexander Lake. New York. 1954. Doubleday and Co. 254 pages. $3.50. True stories of African adventure with emphasis on the strangest of all jungle beasts—the human hunter.

The Compleat Strategyst. By J. D. Williams. New York. 1954. McGraw-Hill Book Co. 234 pages. $4.75. This is a primer on the theory of games of strategy, applying the mathematical approach to the analysis of play in such games.

The Judgment of History. By Marie Collins Swabey. New York. 1954. Philosophical Library. 257 pages. $3.75. The author takes the position that history, despite its inevitable relativity, involves a transcendental claim to objectivity.

Dictionary of European History. Edited by William S. Roeder. New York. 1954. Philosophical Library. 316 pages. $6.00. Dictionary of events and leading personalities in European history from 500 A.D. to the present.

The First Australians. By Ronald and Catherine Berndt. New York. 1954. Philosophical Library. 144 pages. Illustrated. $4.75. The story of the Aborigines of the great island continent.

The Herring Gull's World. By Niko Tinbergen. New York. 1954. Frederick A. Praeger. 255 pages. Illustrated. $4.00. A study of the social behavior of birds, presented in popular fashion.

The Zoo Comes to You. By Burr W. Leyson and Ruth Manecke. New York. 1954. E. P. Dutton and Co. 88 pages. Illustrated. $2.95. Profusely illustrated book about zoo animals for the younger audience.

The Permanent Revolution in Science. By Richard L. Schanck. New York. 1954. Philosophical Library. 112 pages. $3.00. The author's thesis is that a common method has been emerging in the different sciences which recaptures the dynamism of teleology without the fallacy of local cause and which preserves the field theory of mechanism without asserting invariance of behavior of the element.

The Way of the Four Winds. By Yrjo Kokko. New York. 1954. G. P. Putnam's Sons. 286 pages. Illustrated. $5.00. A picture in text and photography of life in Lapland and the people who live there.

The Garden Gate. By Sam Caldwell. New York. 1954. Greenberg. 80 pages. Illustrated. $1.00. Collection of pertinent and practical garden comments and advice given over the air by the author, who is known to radio listeners on CBS as "Old Dirt Dobber."

The Catholic Travelers' Guide. Compiled by Eileen O'Hayer. Chicago, 1954. Published by Extension, 1307 S. Wabash Ave. 168 pages. $2.00. Information for Catholics as they travel, including time of Masses, Confessions, Novenas etc., classified geographically.

For Coleopterists

A Coleopterist's Handbook. Edited by George B. Walsh and John R. Dibb. London, E.15 England, 1 West Ham Lane. 1954. Amateur Entomologists' Society. 120 pages. Illustrated. $2.50.

This handbook is designed to aid the beginner and the practicing coleopterist in carrying on field work and in overcoming difficulties attendant thereto. It is a symposium of advice contributed by experienced individuals. It is a practical guide for the collector and in large measure applicable to situations in the United States.

Lakes and Rivers

Life in Lakes and Rivers. By T. T. Macan and E. B. Worthington. New York. 1954. Frederick A. Praeger. 272 pages. Illustrated in color and black and white. $4.50.

This is a study of the life in British lakes and rivers. It covers the interesting and important animal and plant community of a pond or lake, being actually an important ecological study by two biologists concerned with fresh-water life.

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THAT CURIOUS WORM—THE LEECH

(Continued from page 357)

microscope slide under low power, we can see the tiny proboscis slide down the neck and into the meat. After a good feed the digestive sacs fill out in an attractive pattern with bright red blood. Under the microscope again we see other details—a small brownish plate on the neck, under which lies the hirudin gland, and sometimes vorticellas, a type of one-celled animal, attached by their stalks along Clepsine's body, apparently doing it no harm.

If it is young-bearing time, up to thirty threadlike, small Clepsines can be seen attached by their rear suckers to the under side of the parent. This Medusa effect is quite a startling sight, particularly when the young begin stretching out toward the meat on which the parent is feeding. The latter will sometimes put half-sucked prey within their reach, although they often forage for themselves. When the young are older they sometimes shift to the parent's neck region, possibly to get nearer to the food its eating. If necessary the young will draw nourishment directly from the parent's tissues, an albuminous secretion serving as the food.

Leeches can be kept without trouble in a home aquarium—by themselves, however, not with fish or turtles. A few live pond plants should be added for oxygen, and these, plus a stone or two, will aid in skin shedding. An occasional meat feeding—perhaps once a month—is enough; the water and meat remainders should be poured completely off after an hour or so, and the aquarium rinsed and refilled with pond water or dechlorinated tap water. A collection of different types of leeches, with varying patterns and colors, can be so interesting that it is easy to change one's mind about the idea that "nobody likes worms."

WHAT OF THE MAGPIE

(Continued on page 372)

become unmistakable pests?

Within just the past year, there has been a wide change of opinion favorable to the coyote. Until recently there was a bounty paid on the American eagle in Alaska. Many States are beginning to recognize the benefits of hawks and owls and to protect them.

How long before the magpie may be recognized as a bird of some good characteristics, too?

Wild Pets

The Book of Wild Pets. By Clifford B. Moore. Boston. 1954. Charles T. Branford Co. 553 pages. Illustrated. $5.95.

This is a second printing of this valuable guide to the care in captivity of fishes, reptiles, insects, small mammals and birds. It is written for the layman and for the teacher, and is both practical and interesting. The aquarium is given thorough consideration, as is the maintenance of a terrarium. The section devoted to keeping insects and spiders as pets is specially interesting, and the parts concerned with the small mammals and birds of notable practical value. Our native birds, of course, are discussed from the viewpoint of attracting them and extending hospitality to them. Excellent and profuse illustrations add significantly to the value of this republication of a book first published in 1937.

Peterson Abroad

A Field Guide to the Birds of Britain and Europe. By Roger Tory Peterson, Guy Mountfort and P.A.D. Hollom. Boston. 1954. Houghton Mifflin Company. 318 pages. With more than 1100 illustrations, 600 in full color, and 367 distribution maps. $5.00.

This is the first field guide to the birds of Europe to include within covers all European birds, and this guide will be published in at least six countries and in at least five European languages. It is a book, of course, that anyone interested in bird life in Britain and Europe will find an essential part of one's baggage on a trip abroad. And it belongs in the library of every serious bird student in America. In it the Peterson identification system is followed. Throughout the popular names of the birds are given in English, Dutch, German, French and Swedish. Where there is an identity of species in Europe and North America, the popular name of the North American species is indicated. Where such identity does not exist it might have been interesting to North American users of this book, when abroad, if some reference were made to any closeness of relationship with our own species. For instance, just how does the pine grosbeak differ from our own pine grosbeak? Perhaps this would have been too space-consuming and, possibly, sometimes confusing, and it is certainly a minor consideration with respect to a book so complete and satisfying as a guide to bird identification.

Venezuelan Birds

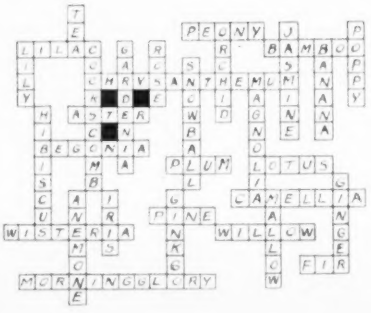
Aves Venesolans. By Kathleen Deery de Phelps. Caracas, Venezuela. 1954. Creole Petroleum Corporation. 104 pages. With 70 color plates by the author. Free to educational, cultural and scientific institutions in Venezuela and abroad.

This beautiful collection of color paintings with correlative text and distribution maps is made available by the Creole Petroleum Corporation in the hope that it will inspire major concern in Venezuela for the preservation of Nature in that country. This outstanding work by Senora Phelps should certainly achieve the objective set for it and result in stimulation of interest in and protection of Venezuelan bird life. The author-artist precedes the presentation of the color plates with a simple key to bird identification, and an explanation of the zonal distribution of the birds in her country. She dedicates her book to her father-in-law, Dr. William H. Phelps, who founded the Phelps Collection and natural history museum in Caracas, and to her husband, William H. Phelps, Jr., president of the Venezuelan section of the International Committee for Bird Protection. Both men have led the fight for Nature appreciation and protection in their country.

AUGUST-SEPTEMBER SKIES

(Continued from page 380)

rising 180 degrees from it on the eastern horizon, that the portion of the ecliptic visible, and the moon's orbit, which is never far from it, lies mostly south of the celestial equator and is least inclined to the horizon. As a result the moon on several successive nights nearest to the date of full moon will be retarded in rising less than at any other time of year. The *ave age* retardation of moonrise is 50½ minutes. The variability is great, however, especially in higher latitudes, depending chiefly upon the facts that the moon's orbit is elliptical and that its inclination to the horizon changes so greatly. When the moon is farthest north of the equator there may be even one day or more in high latitudes each month when the moon will not pass below the horizon. In latitude 40 degrees north the range in retardation of moonrise near the phase of full moon is actually from 13 minutes to 80 minutes, the *least* retardations in all northern latitudes occurring around the times of the two full moons nearest to the autumnal equinox. The names Harvest Moon and Hunter's Moon were appropriately given to the September and October full moon respectively. For additional hours of bright moonlight following so closely after the setting of the sun increases the time available to the farmer for the harvesting of his crops, and, a month later, to the hunter, who also appreciates the advantages of bright moonlight following so soon after the setting of the sun.



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UNDER THE MICROSCOPE

By JULIAN D. CORBINGTON

Photomicrographs from slides loaned by George M. Conant, Ripon, Wisconsin.

PRICKLY PLANTS

MOST of us have something of the detective instinct in our makeup, and are either good at solving riddles and mysteries or, at least on occasion, fancy ourselves in the role of Sherlock or Lord Peter. Modern life is full of little opportunities to practice the analytical art, from working crossword puzzles, playing the newer Scrabble, or attempting Goren's bridge games, to outguessing the author of the whodunit. Science, which deals with the actualities of life, is composed of an infinitude of problems, great and small, and their solution demands both deduction and induction.

Jenner was faced with the question of why milkmaids did not contract smallpox, and Mendel had to find out why recessive characters reappeared in one-fourth of the third generation. Such as these are the tasks imposed by research. But there are times when the scientist must become a detective in the more literal sense if he is to succeed in solving certain enigmas.

Take the field of botany, for example. Plant morphology, which interprets structure in terms of origin, is one of the basic divisions of botany, and among its generalizations, worked out by patient and careful botanical detectives of the past, is the statement that the bodies of higher plants consist of three fundamental organs —root, stem, and leaf. Today's student learns, almost as routine, that all other plant parts are modifications of one of these three. Thus a flower (this Department, June-July, 1940) is made up of modified leaves; an Irish potato is an underground stem; a sweet potato is a root.

To justify such pronouncements there must be criteria established for the recognition of root, stem, and leaf, no matter how altered or in what guise they may be encountered. The typical plant stem rises from the ground and displays the leaves to sunlight, where they may manufacture food. The roots are underground where water and minerals may be absorbed, and the stem transports water upward from root to leaf and food downward from leaf to root. But these positional features cannot be relied on since there are underground stems as well as aerial roots, and it is the anatomy of the parts that decides identification, not their location with reference to the soil.

A *stem* has joints called *nodes*, and it is at these joints alone that leaves arise. Neither a root nor a leaf has nodes. The branching of *roots* is not regulated in the same way as that of stems, owing to the absence of nodes, and likewise roots do not bear leaves or buds. *Leaves* are produced from stems and never from roots; they arise only at nodes, and almost always have buds in their axils. The *axil* of a leaf is the angle formed between the leaf and the stem above it; the upper or smaller angle between leaf and stem (L., *axilla*, armpit).

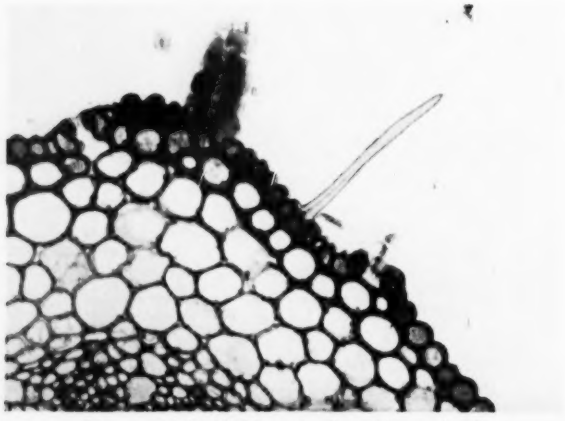
Armed with these basic definitions, the botanist may turn scientific detective when he encounters plant structures that seem to be neither root, stem, nor leaf. He may also apply a rule of establishing intermediates to connect two extremes that, taken alone, seem unrelated. Thus a stamen does not resemble a typical leaf, but in certain water lilies there is a perfectly graded series from leaf to stamen, evidence held to prove that the stamen is a modified leaf. Among highly altered parts, met with in wide variety, are defensive weapons designated as thorns, spines, and prickles. These are presumably of value to the plants that possess them in discouraging grazing mammals.

A *thorn* is defined as a short, sharply-pointed branch. If the word is correctly limited, the thorn is always a modified stem, developing from a bud in the same way as do regular leafy branches. The hawthorn and honey locust are favorite examples. Osage orange and wild plum are others. These thorns develop in the axils of leaves or at the ends of branches, in the position of either axillary or terminal buds. Sometimes they bear leaves or the rudiments of leaves. On old honey locust trees, adventitious thorns arise from the trunk in the same manner and from the same tissues that give rise to adventitious stems, and these thorns branch and sometimes bear leaves.

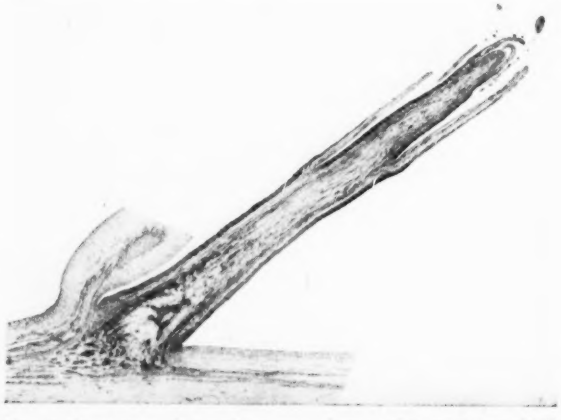
Section of a cocklebur.

The term *spine*, commonly used more or less synonymously with thorn, is properly given in the botanical sense only to those sharp and stiff processes that are modified leaves or parts of leaves. Barberry is a classic example, with very sharp spines located just below branches or buds, in situations where leaves grow on other plants. There are one to five, typically three such spines at each node in the common barberry. In their axils grow short branch stems, bearing the true foliage leaves, and one may find every gradation in this plant between leaf and spine. Gooseberry is another shrub with spines that are modified leaves.

The black locust is a well-known instance, and in this species the spines



Rose prickle, 515X, a single epidermal cell.



Vertical section through young thorn of hawthorn, 16X.

What the business end of a nettle leaf looks like when magnified.

represent *stipules*. These are paired, leaf-like appendages located at the base of the petiole, where the leaf stalk springs from the stem, and are present only in some plants, as the rose, garden pea, and tulip tree. These stipules may be modified to form sheaths, tendrils, or spines. Certain mallows, euphorbia, and spiny amaranth are additional examples in which stipules are altered into spines. In some species of *Astragalus* the *petiole* of the pinnately-compound leaf persists as a sharp spine after the fall of the leaflets. The petiole is the stem portion of a leaf, the expanded part being the *blade*. Leaf *margins*, parts of the blade, may be spiny, as in holly and thistle.

An *emergence*, botanically speaking, is an outgrowth from the epidermis, the cortex, or both, of a plant stem or leaf, and one of the commonest forms is the *prickle*, as in the rose. This is not a modification of one of the fundamental organs of a plant, but merely a superficial development from the outer layers and not incorporating vascular tissues. Prickles are usually scattered about over the surface without particular system. Smilax or greenbrier, blackberry, raspberry, prickly ash, and many others are prickle-bearers. In the large cactus family there are species with thorns, others with spines, and still others with prickles, and sometimes it is difficult to say which of these three is the one involved in a particular sharp-pointed modification.

Even plant *hairs*, or trichomes, may join this roster of weapons. Some hairs are single epidermal cells (see illustration of rose prickle) that grow outward from the surface of stem or leaf blade; others are made of one or more rows of such cells, and some are branched, as in mullein, but all of this type of emergence are entirely epidermal. Anyone who has grasped a nettle (see picture) has made the unwelcome acquaintance of such hairs; they secrete an irritating acid in this genus.

Plants that are structurally or physiologically adapted to live in an environment with a limited water supply, as in deserts, are termed *xerophytes* (dry-plants), and spinescence is one of their common characteristics. Lothelier has described and figured how the British gorse, when growing in moist situations, has leafy shoots, but under xerophytic conditions these become thorns and spines and the plant is then something one would be very happy to avoid. In the wild blackthorn the branches become spiny at the tips, tapering into stiff, leafless points; but when these trees are cultivated, the spines disappear, owing to better conditions of growth.

Many are the fruits that are adapted for dispersal by animals and that employ the method of sticking to hair, fur, and wool for this purpose. In these civilized times, the clothing of man is one of the chief coverings that convey sticktights, burdocks, sweet cicely, Spanish needles, wild carrot, beggar's ticks, cockleburs, sand burs, agrimony, and many others. Additional fruits with prickly outer coats, but for protection rather than transportation, include the chestnut bur and the horsechestnut and Jimson weed capsules. These porcupine-like exteriors are modified fruit coats, which in turn are modified leaves. Most of these structures are emergences, but in burdock and teasel they are spines, since they represent stiffened *bracts*, and these are modified leaves forming the base of an inflorescence. By dint of careful work in comparative morphology of plant parts, the botanist has been able to identify all of these oddities as alterations of a more basic part and has thus qualified as a scientific Hawkshaw.

SPIDERS AID OPTICS

SYNTHETIC substitutes have replaced a large number of natural products that were formerly in wide demand. Silk gives way to rayon, shagreen to emery paper, whalebone to steel, and there are now fair to excellent artificial pearls, ivory, tortoiseshell, sponges and rubber tires. But there is one item for which no man-made substitute has yet appeared, and that is spider webs. Used as cross-hairs on numerous fine optical instruments, the spider web is unchallenged for its fineness, strength, and uniform diameter.

The illustration shows Wally Loucks, research analyst at Northrup Aircraft Company, Anaheim, California, in the act of obtaining web from the justly feared female black widow. He lures the spider onto a stick and takes the thread when the arachnid descends from stick to table, spinning as she goes. The diameter of this web is from one and one-half to two ten-thousandths of an inch. Northrup reportedly uses these webs as cross-hairs on sighting and aiming devices for tanks and 105 mm self-propelled howitzers. Similar webs have long been employed

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Loucks and Black Widow. Photograph by Wide World, courtesy Balco News.

in other sighting optical instruments.

Spiders produce two kinds of web. One is smooth, strong, and elastic, for descending or traveling from one part of a web to another. The spider may climb back up its own line. The second type is weak and sticky, for trapping food. Only the first form is of any use in optics.

NEW LOW POWER MICROSCOPE

Wide Field Tube Microscope.

FOR A number of years the Bausch & Lomb Optical Company has produced a wide-field tube mounted in a folding tripod. Now the big Rochester firm has decided to dress up this useful magnifier by placing it in a stand, and they call the one herewith pictured the *Wide Field Tube Microscope*. The stand is a single casting, light but sturdy, finished in neutral gray. The tube is firmly held by a pair of tension springs, but slides readily up or down for focusing or removal. The stage is an unattached disc, white on one side and black on the other. Magnifications available are 10X, 20X, and 40X.

The chief features are a wide and flat field, and long working distance, permitting brilliant illumination and the use of instruments. Also interchangeability must be cited, since the tube may be slipped out of the stand and used with a folding tripod, if preferred, or carried in the hand or pocket. The tube itself is a compound microscope, not a hand lens, and the definition is splendid.

Some of the commoner uses are in the examination of the larger subjects, as embryos, parasites, small flowers and fruits, minerals, and fossils. We have found this instrument of great value in demonstrating sections of entire organs in histology; for example, stained balsam mounts of cross section of intestine. Many students fail to see the woods for the trees in this sort of work, and sometimes the minute details are stressed at the expense of the larger organizational plan. To see the relative proportions and relations of mucosa, submucosa, muscularis, and serosa, the wide-field microscope is greatly preferable to the regulation laboratory instrument. The same would apply to sections of kidney, liver, bone, and other organs.

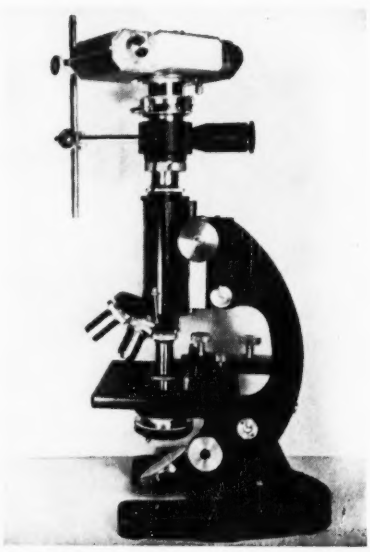
Industry employs these tube microscopes for examination of textiles, raw materials in general, welds, castings, lay-out of fine work, and many other shop and field-trip inspections. They should be popular with stamp and coin collectors and those who work with engravings. The one we examined was the 20X microscope and it is priced at $49.00. For further details write the Bausch & Lomb Optical Company, Rochester 2, N. Y.

NEW PHOTOMICROGRAPHY ASSEMBLY

MANY a microscopist owns both a microscope and a camera, yet may never have tried his hand at the fascinating art of taking photographs through a microscope, deeming the procedure too complex to master. Unitron has produced a new set that connects the two instruments in a simple and ingenious manner, very easy to set up and use.

In the assembly illustrated, a 35 mm camera and the Unitron MLK microscope are used, but other makes and sizes of both instruments can be connected equally well. The microscope eyepiece slips through the base of the assembly and thence into the microscope body tube, where it is secured firmly. The camera is mounted above the assembly, held by an adjustable bracket and the camera lens is left in place and its connection with the microscope rendered light-tight by resting within one of a series of concentric rings, accommodating to different sizes of camera lens mountings. The camera focus is set at infinity. The microscope is evenly illuminated and then focused on the specimen.

The assembly features a lateral viewing telescope by means of which the specimen



United Scientific Company's assembly of a 35 mm camera and the Unitron MLK microscope. Other makes and sizes of both instruments may also be combined.

may be seen at all times, up to the instant of exposure or even during a time exposure. This is of great importance with living material. Actuating the left-hand plunger reflects all light from the specimen through the telescope to the observer's eye. The telescope eyepiece is rotated until a crosshair is in sharpest focus, an operation that permits compensation for variations in the sight of different individuals. The right-hand plunger is then pressed, directing most of the light into the camera, but reflecting a small portion to the telescope so that the specimen may be observed. The camera sees what the observer sees.

This appliance may be used with every type of photomicrography—bright or dark field or phase contrast; with transparent or opaque specimens; with ordinary or polarized light; for black-and-white or color, still or motion pictures. It is designated the Unitron Model ACA Photomicrography Set and comes in an attractive wooden case with instructions and exposure data at $39.95, postpaid. Order form or write to the United Scientific Co., 204-206 Milk St., Boston 9, Mass.

POSTMOR TEMQUOTES

Gather ye rosebuds while ye may:
Old Time is still a-flying;
And this same flower that smiles to-day
To-morrow will be killed, fixed,
Washed, dehydrated, infiltrated,
embedded,
Sectioned, affixed, deparaffined,
Hydrated, stained, washed, dehydrated,
Counterstained, dehydrated, cleared,
Mounted, labeled, studied, and stored.

—Robert Herrick

first flight

Without trust in Daddy's strong arms, fear would blot out the fun of first flight. But because Daddy's smiling, loving face is below, life adds a thrilling new dimension, founded in love and trust.

All our adventures begin in and come home to the security we cannot do without.

To give and to get security is the main business of living. It is a privilege and a responsibility. It provides us life's finest rewards.

Have you ever thought that this security is possible only in a democracy? And that this is the source of America's greatest strength? For we continue to grow stronger as a nation when more and more secure homes are bulwarked together.

The security of your country depends on *your* security.

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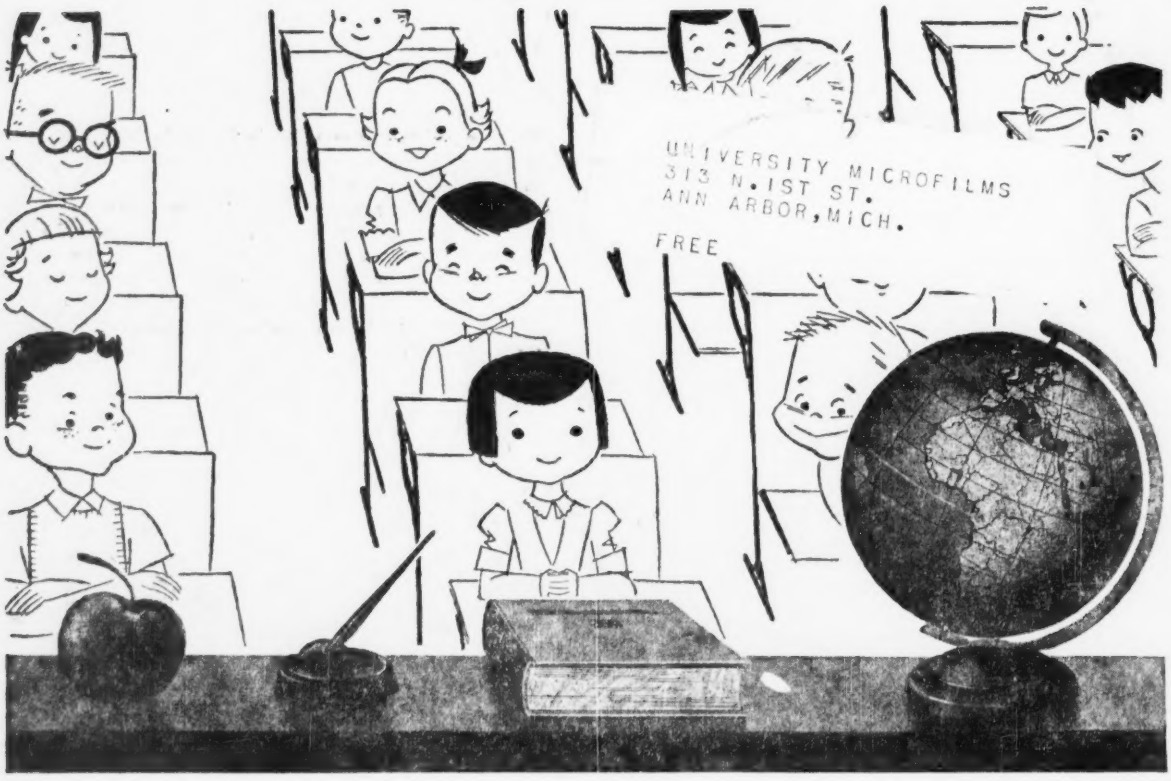

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